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THE WATER SUPPLY OF HAVANA

Badly Managed by the Spaniards—Great Improvements Under American Rule—Cubans Checking Water Waste—Some Needed Reforms

By Charles E. McDowell

THE first attempt of which any record can be found to supply the city of Havana with water for domestic purposes was made at the close of the Sixteenth Century. A dam was built across the Almendares River, at a point about a mile above Puentes Grandes, to furnish the head of water for the flow through the Zanja Real, the head of which is immediately above the dam. The system which was then inaugurated bears little resemblance to the system as it has been perfected and modernized since the close of the Spanish-American war.

CONDITION UNDER SPANISH RULE

In 1837 a set of filter beds was constructed close to the Almendares River a short distance above the dam, and from these beds a 20-inch iron main was laid to and into the city. This was termed the Aqueduct Fernando VII. These filter beds, though of antiquated type, are in comparatively good condition to-day and can be utilized to bring in the Almendares water should there be a break in the Canal de Albear (Vento Aqueduct.) The Almendares water at this point has been shown by test to be free from contamination, except from such suspended material as can be readily removed by filtration.

In 1886, during the construction of the Vento Aqueduct, and before its entire completion, together with the reservoir system, a branch main of 20 inches in diameter was run from the Vento Aqueduct at a point opposite the filter beds to the filter beds, the Almendares River water was cut off from the beds, and from that time until the completion of the Vento system in 1893 Vento water was supplied through the Aqueduct Fernando VII. On the completion of that system that portion of the Aqueduct Fernando VII. to the south of Palatino was cut off and has not since been used. During the past year the filter beds and the connections between them and the Vento Aqueduct, as well as the Aqueduct Fernando VII., were thoroughly cleaned and repaired. The old gate valves were all

INTERIOR VIEW OF PALATINO RESERVOIR

EXTERIOR VIEW OF PALATINO RESERVOIR

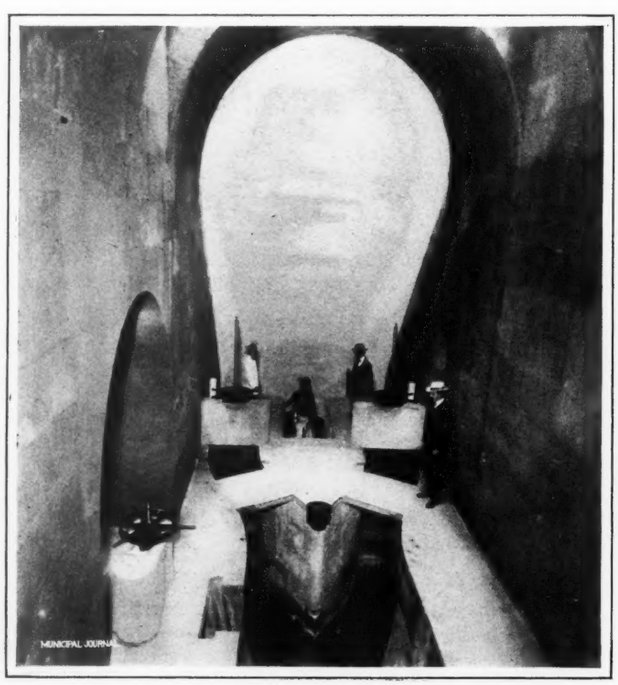
repaired and renewed. The main 20-inch pipe was cleaned by opening the manholes and passing through the pipe a metal ball armed with sharp pricks to cut away the incrustations, the ball being forced through under water pressure. By this means an auxiliary source of supply, either from Vento or from the Almendares River direct, is available in case of accident to the Vento system.

While under the control of the Spanish authorities the plant was inefficiently and expensively operated, so that at the time the Americans took possession the entire outfit was about as run down as it could be. During the short period of American control conditions were greatly changed and everything put in first-class order. Among other extensions a water supply was furnished to Casa Blanca and the town of Regla, both suburbs of Havana, though Regla is a separate corporation.

Greatly Improved by Americans

The water supply to Casa Blanca (which also embraces the supply to the garrisons at Morro and Cabañas) is carried through a 6-inch flexible joint cast-iron pipe from a connection with the city main at the foot of Empedrado street, across the main channel to Havana Harbor, to the opposite shore immediately under Cabañas Fortress. The greatest depth of water in the channel along the line is fifty-six feet. The pipe was lowered to the bottom on an inclined timber skid or runway, which was hinged to an inclined platform constructed on the side of a barge. The skid was made in three pieces, two sixty feet long each, and one thirty feet long—in all, one hundred and fifty feet—which was found to be of sufficient length to reach the greatest depth at an angle with the bottom not injurious to the flexible joints. The skid was suspended by half-inch galvanized iron chains attached to hangers made of one-half by two and one-half inch iron. The chains supporting the portion of the skid farthest from the barge were brought on board a steel launch, being led over iron sheaves fastened in timbers that were lashed on the crossways of the boat and projecting over the sides sufficiently to afford clearance in raising or lowering the skid. On each timber was rigged tackle for raising or lowering the skid. A scale of depths for each chain was calculated and the chains lowered accordingly as the work reached deeper water, and raised again on reaching more shoal water.

Before the completion of this system the inhabitants were dependent upon a few local wells, more or less contaminated, or water supplies from Havana mains, carried across the harbor in boats and delivered in a central tank, from which it was sold by a contractor at the rate of five cents per gallon, the people carrying the water from this central point of distribution to their respective homes. This improvement has added much to the health of the community, affording an adequate supply of wholesome water to all the citizens of the town.



INLET AND ENTRANCE TO PIPE GALLERY AT VENTO SPRINGS

At the present time the water supply of Havana is under the charge of the Department of Water Supply and Sewers, with M. D. Diaz as chief and O. Giberga as chief engineer of the city. There are 108.23 miles of pipes now in use, ranging in size from three to forty-two inches, 69.92 miles being of 4-inch pipe.

Present Condition of the Department

Out of the 18,000 houses within the city limits, 15,000 are connected with the waterworks system. All but 1,000 of the 18,000

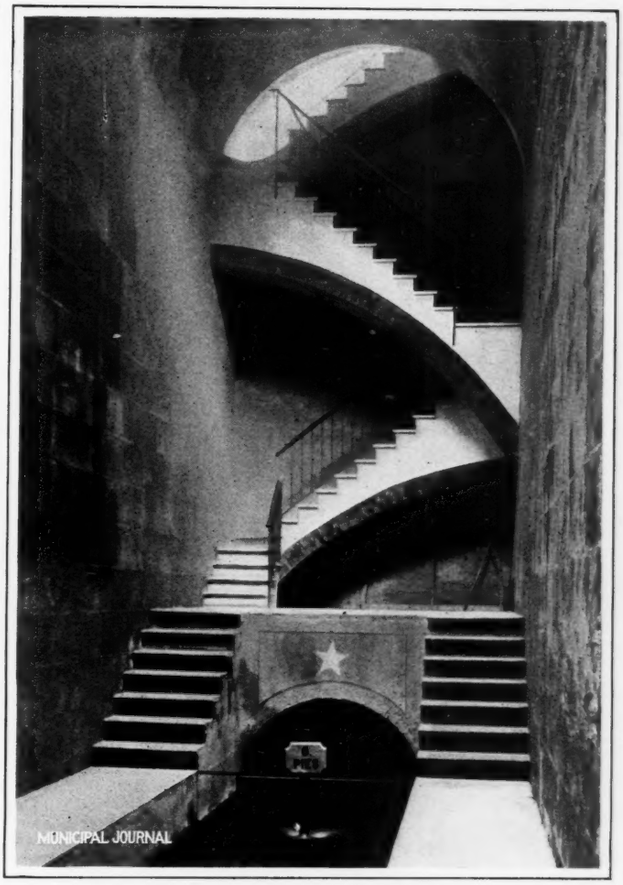
houses are one story, but most of the new houses building are two and three stories in height. The growth of the city is at a rapid rate and the time is not far distant when the 4-inch pipes now in use will be inadequate to the demand. For this reason the old 4-inch pipes are being slowly replaced with 6 and 8-inch pipe, and when the new contract for sewering and paving the city is undertaken the larger sizes of pipe will be substituted for the smaller sizes.

About one hundred and fifty employees are required to administer the affairs of the department and the expenditures for 1902 aggregate $147,000. As in American cities, all connections from the street mains to house lines are made by the department and a charge of $8.12 each made, which is paid by the householder. Upon application for water service to the department specifications are provided and then the householder is allowed to secure anyone to perform the services. No license of any kind is required. Twenty dollars per year is charged for water for all places paying a maximum rental of thirty-four dollars a month, and all paying a rental above that sum, whether it is thirty-five dollars or two hundred, are required to pay forty dollars for their water service. Meters have been installed in a few houses and a rate of four cents a cubic meter established. Many of the meters placed in service during the period of American rule have been taken out by order of the City Council on complaint of the Spanish Bank—which is the recipient of all the revenue—that its returns were not what they should be. The last official report shows a daily consumption of 44,000,000 gallons, and it is said fully thirty per cent. is wasted owing to the fact that few meters are in service.

The bills for the water service are rendered by the Council and the collections are made by the Spanish Bank, which guaranteed the payment of $7,500,000 of bonds in Spanish gold. From the net revenue the interest and sinking fund are paid.

Some Needed Reforms

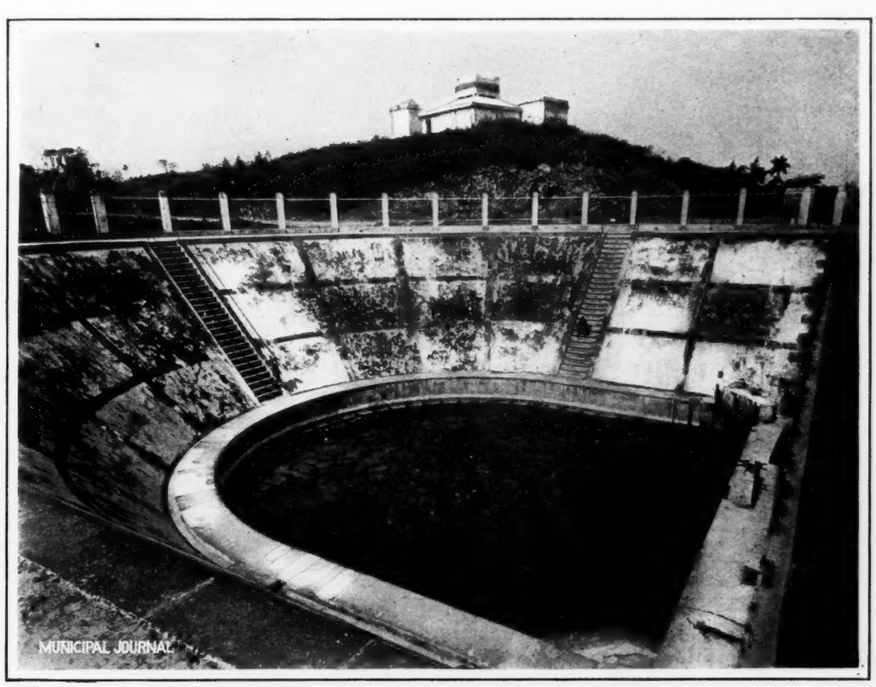
A careful survey of this entire system and an examination of its administrative functions revealed the fact that with proportionate rates and efficient administration the income could be increased from twenty-five per cent. to forty per cent. The department is hampered in many ways: First, by want of proper maps, records, plans, etc.; second, by the constant interference and changing of rules by the local government; third, by the appropriation of all the revenue by the Spanish Bank to pay a high rate of interest and other charges. If the new loan now talked of is made by the city and the present bonds refunded at a lower rate of interest, there is no reason why the water department should not become a source of revenue to the city.



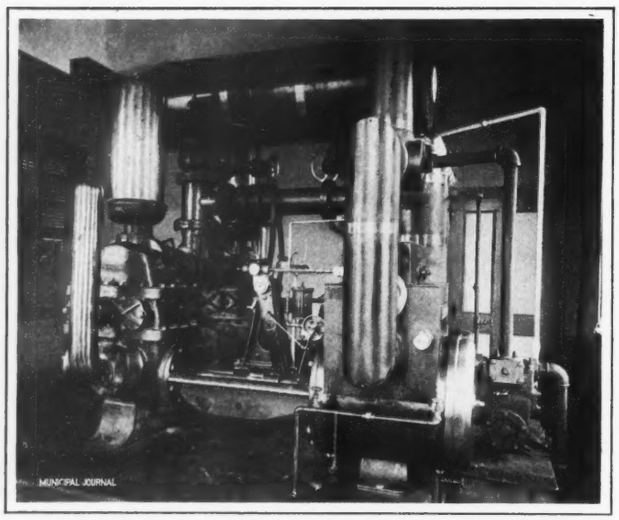
ENTRANCE TO MAIN AQUEDUCTS, LEADING INTO PIPE GALLERY

One of the principal improvements of the water service made by the Army of Intervention was the building of a new pumping station at Palatino, a plain brick building, equipped with a D'Auria horizontal compound condensing pump, with a capacity of 1,000,000 gallons daily, and three Worthington horizontal tubular boilers of 100-horse power each. This was built to furnish water to the high grounds at Principe and beyond to Aldecoa, Pirotechnia and Mercederes Hospitals, Camp Columbia—where the Seventh United States Cavalry was stationed—and Quemados, where General Lee had his headquarters. Mains were laid to all these places and a service of some 700,000 gallons daily given at an expense of about $50,000.

At an expense of about $50,000 an extension is being made in another section of the city which has suffered for the want of water for many decades. The only supply it has ever had was by means of water carts, the supply being peddled out at so much per gallon, in some parts of this section one cent a gallon in Spanish silver being charged. This tax became unendurable and shortly after the American conquest the improvements were commenced. A reservoir, 40 x 40 x 18, was built at Vibora, which has an elevation of one hundred and fifty feet above the pumping station and



VENTO SPRINGS, NEAR HAVANA; DAILY CAPACITY, 44,000,000 GALLONS—SPANISH BLOCKHOUSE ON HILL ABOVE THE SPRINGS



PUMPS AT CASA BLANCA, ACROSS THE HARBOR FROM HAVANA—INSTALLED BY AMERICANS TO SUPPLY FORTS WITH WATER

is distributed to that section by gravity. A 12-inch pipe is laid from the reservoir to the highway, a distance of 1,100 feet, thence 3,500 feet of 10-inch pipe and 2,300 feet of 6-inch pipe to the old supply in the city.

Source of Present Supply

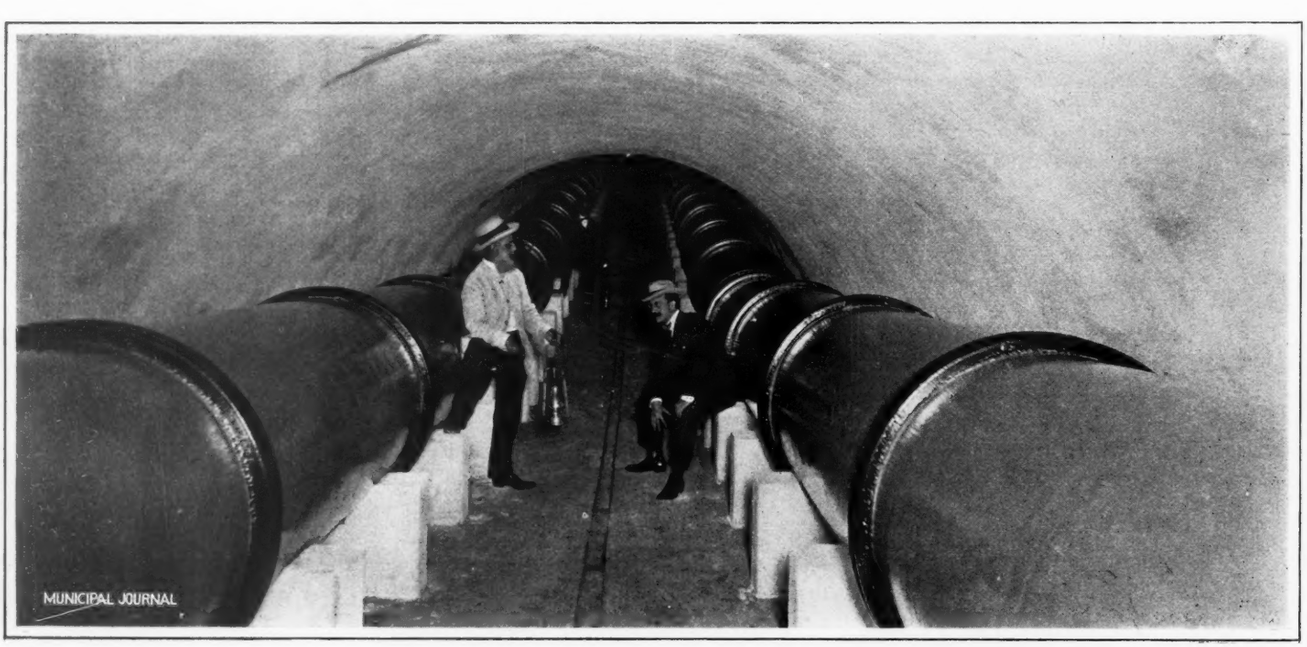
The Vento Springs, the source of the city's water supply, are located ten miles distant, to reach which one rides over one of the most beautiful driveways in Cuba. It leads out through Cerro, the grove of royal palms, a mile in length, two hundred in number, fifty feet apart in perfect alignment; past the concrete palace of the Kinta Delicias, built by Americans for a Cuban lady and costing $100,000; past sugar and tobacco plantations, pineapple fields, and mango and banana groves without number. Standing upon the parapet of the receiving basin a wonderful stretch of landscape beauty charms the eye.

The Vento Springs are about four hundred in number, the flow of which is collected in one large receiving basin one hundred and fifty feet in diameter at the base and two hundred and fifty feet in diameter at the top. Every necessary protection has been taken to prevent the surface water from flowing into it. The supply of pure, sparkling water from these springs is more than adequate to the demand and it is likely will meet the requirements of the city for years to come, as many millions of gallons run to waste daily.

From this receiving basin the water is conveyed by a brick and concrete tunnel extending under the Almendares River and running on the north side of the river for a distance of six miles to a point where it empties into a receiving reservoir at Palatino. From this reservoir it is carried by gravity to and through the city of Havana.

This enterprise was inaugurated in November, 1858. The first wall of the collecting basin was laid in June, 1861, while the work on the tunnel commenced in May, 1865, and the first water passed through the tunnel March 1, 1872. The work was completed in 1893.

The Palatino reservoir is divided into two parts, each holding about 8,000,000 gallons, covering an area of 3.8 acres with an elevation above the city of 95.57 feet. The retaining wall is 20.5 feet high, being 6.73 feet thick at the base and 2.79 feet at the top. The concrete bottom of the reservoir is one foot six inches thick. The stone used in the construction was of a coral limestone nature mixed with a calcareous sand, no silicious sand being obtainable. Climatic conditions in Cuba make it necessary to keep all classes of concrete construction wet for a long time. The inside faces of the reservoir were plastered with a mortar made of one part cement, one of sand and one of lime, the floor being finished with a plaster composed of one part cement to two parts sand. The whole work cost about $6,000,000.



PIPE GALLERY UNDER ALMENDARES RIVER, LEADING FROM VENTO SPRINGS TO MAIN AQUEDUCT

MUNICIPAL SOCIALISM IN ENGLAND

The Latest Development—The Question Fairly Stated from a Neutral Standpoint—The Public Greatly Benefited by "Municipal Trading"

*By James Boyle**

THE subject of municipal trading is one which has aroused considerable interest of late, and many arguments have been adduced for and against it by its advocates and opponents. Those who are opposed to municipalities engaging in reproductive undertakings say that such action discourages private enterprise and paves the way for socialism. They assert that municipal bodies have not the special knowledge which is required in order to conduct such undertakings to a successful issue. They fear that if municipalities engage in trade the time which ought to be devoted to the proper duties of administration will be frittered away on trading and manufacturing details. In their opinion that to put town councilors in the position of having to regulate the wages of their electors would have a tendency to set wages against votes, and would raise very difficult labor questions. And they state that the expenditure upon such undertakings increases the burden of the rates, which is already unduly heavy.

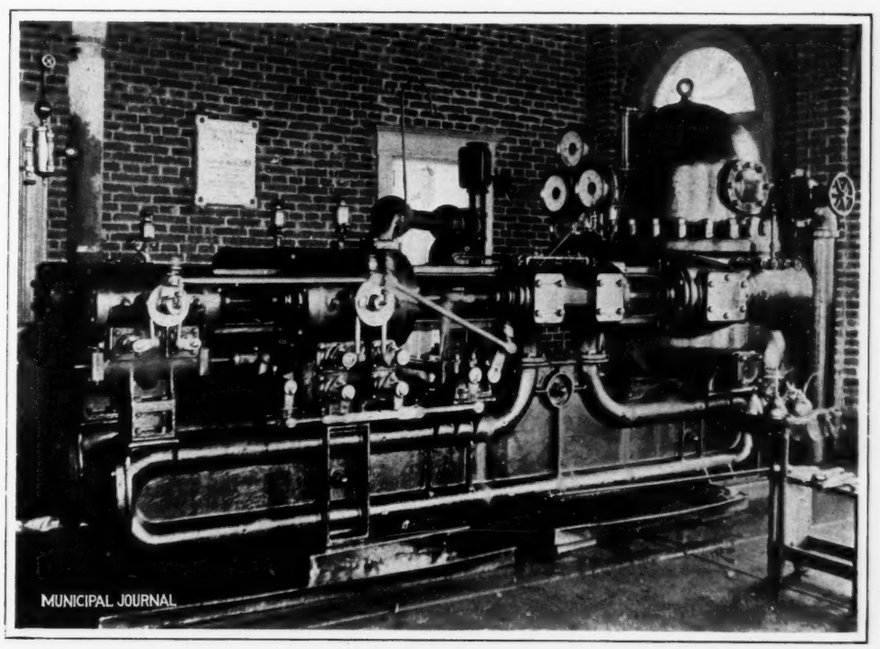
DOES NOT ENCROACH UPON PRIVATE TRADING

In reply to this indictment the advocates of municipal trading deny that it encroaches upon private trading, as it only deals with works of public utility, which private capitalists either can not accomplish or can not do so well. They say that a committee of town councilors, specially selected for their business ability, and having a high trained permanent staff under them, are quite as competent to deal with matters such as gas, water, and tramways as the board of directors of a gas company, a water company, or a tramway company; and they show that whereas in the case of a company the profits go into the pockets of the shareholders, many of whom are non-resident and have no connection with or interest in the town, in the case of a municipal enterprise the profits go into the borough fund in alleviation of the rates. They regard the suggested labor difficulties as chimerical, as no town council has any control over the standard rate of wages, and it is in the last degree improbable that the ratepayers would consent to a higher scale being paid. They point out that gigantic trusts are being everywhere formed with the object of enriching their founders and shareholders at the expense of the general public, and that municipal enterprises are alone able to stand between these monopolists and the townspeople, securing to the latter the full benefit of the corporate investments and giving them, through their representatives in the council, effective control of them. And they affirm that such undertakings seldom permanently increase the burden of rates, and where they do they confer such benefits upon the town as add greatly to the general wealth of the community.

It is not our intention to enter the lists on behalf of either of the parties whose views we have endeavored impartially to state. The correct view, it appears to us, lies midway between those who assert that all municipal trading is wrong in principle and those who would municipalize all the common needs of life. There is a general consensus of opinion that the supply of water, lighting, and locomotive power within the borough should be under the effective control of the ratepayers; to which may be fairly added slaughterhouses, bath and wash houses, lodging houses, market halls, and, in the case of seaports, docks, piers and quays. These are matters intimately bound up with the commercial prosperity of the town and the health of the inhabitants, and therefore may well come under the management of the town council.

NO GENERAL RULE FOR CHOICE OF ENTERPRISE

But no general rule can be laid down as to what enterprises may be engaged in with advantage to a town and what may not; the particular circumstances of each town must decide the question for themselves. Several towns, such as Doncaster, Chester, and Lincoln, are the owners of racecourses, from which they derive a considerable income—sufficient, in the case of the first-named town, to enable the corporation to do away with the borough rate; but probably if other towns were to attempt to follow their example, the result would be disastrous.



ONE OF THE D'AURIA PUMPS AT NEW PUMPING STATION, PALATINO—INSTALLED BY AMERICANS, HAVANA, CUBA

Health and pleasure resorts may and do profitably invest money in schemes which will attract the visitor and pleasure seeker. Thus, the corporation of Bath owns the hot springs, nearly all the cold springs, the famous Roman baths, and the pump rooms, and has recently extended the grand pump room with a Roman promenade at a cost of $150,000; Bournemouth owns the winter gardens and golf links, and provides an excellent orchestra of more than local fame; Harrogate draws a large revenue as proprietor of the royal baths and springs, the winter garden and theater, and the royal spa concert rooms and gardens; Leamington owns its celebrated baths and pump room, which are patronized by thousands who frequent this charming town every year; Southport draws about $17,500 a year from pleasure boats on the lakes in the marine parks, and considerable receipts from such amusements on the beach as a switchback railway, bicycle railways, tobogganing, and the "aerial flight"; and Brighton is the owner of the royal pavilion and the local aquarium.

Many towns engage in farming, in connection with their sewage farms, with profitable results. Nottingham has a large sewage farm some miles out of the town which yields from the annual sale of

* U. S. Consul, Liverpool. In April, a year ago, Mr. Boyle published in the Consular Reports a statement about municipal socialism in Great Britain which attracted widespread attention. The above article is from the Liverpool *Daily Post* of April 7th and was forwarded by Mr. Boyle to the State Department and published in Consular Reports for May 5, 1903. The article states the question fairly from a neutral standpoint and is probably the most reliable and up to date report in a brief form of the development of "municipal trading" in Great Britain which can be obtained.—[EDITOR.

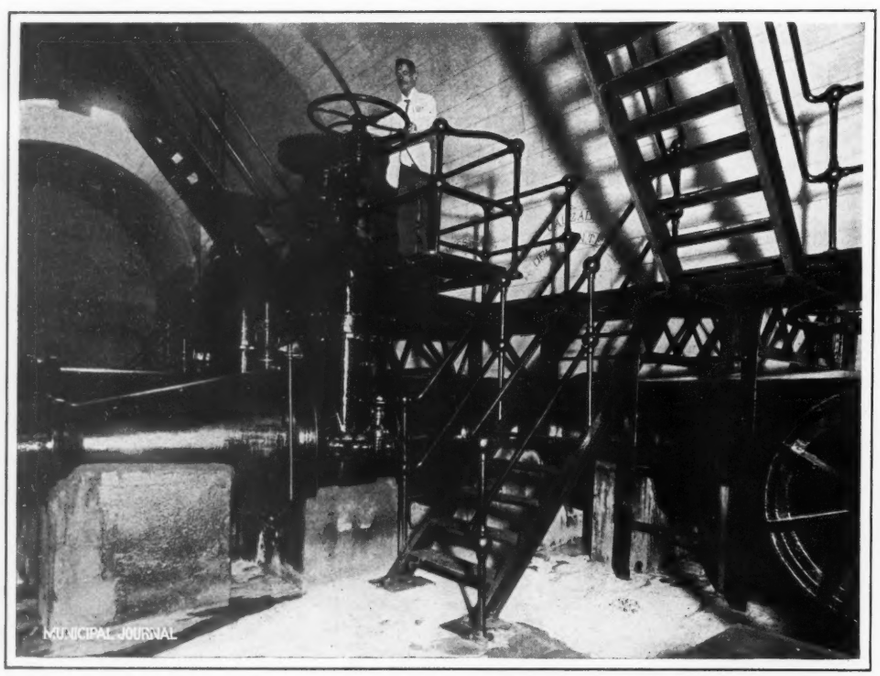
live stock about $20,000 and from butter and milk about $12,500. Wolverhampton draws an income of about $32,500 yearly from its sewage farm, which practically covers the expense of its maintenance; and Birmingham sells from its sewage farm stock, wool, crops, and milk to the value of over $125,000 a year.

Great Diversity in Municipal Undertakings

The corporation of Colchester owns the famous Colne oyster fishery, from which some 3,000,000 oysters are taken every season to delight the palates of epicures. Bradford has a hotel in connection with the public markets, under the direct control of the corporation, and Plymouth owns the Royal Hotel and the adjoining theater.

Birkenhead [in Cheshire, opposite Liverpool, on the Mersey River] is the owner of the ferry rights over the Mersey to Liverpool, and maintains a fleet of 12 steamers, the profits from which relieve the rates to the extent of about $50,000 yearly.

York owns the Foss Canal and also a fleet of steam tugs for the towage of vessels between Hull and York. Manchester is the principal shareholder in the Manchester Ship Canal, having invested $25,000,000 in that great undertaking. The corporation of Bradford has erected a "conditioning house" for the testing of wool, yarns, and cloth, fitted up with the best machinery for the testing of woolen goods, the income from which is more than sufficient to meet the expenditure; a plant has been laid down for the manufacture of paving slabs from the clinker produced by the furnaces of the refuse destructors, which, mixed with cement and faced with granite chippings, forms an excellent material for this purpose; and a large quantity of fish manure is made from fish refuse received at the depot.



GATE VALVES LEADING FROM PALATINO RESERVOIR TO THE MAINS, HAVANA, CUBA

Liverpool, like Bradford, makes an artificial stone from the clinker produced by the furnaces of the destructors, which is being used in the construction of model dwellings for the working classes. Leicester also utilizes its clinker in the manufacture of paving slabs, and maintains three sewage farms, which yield an income of about $110,000 annually.

In Bristol, practically all the work connected with the street and cleansing department is done by the corporation's own workmen, and in the corporation workshops carts and barrows are built and repaired, harness is made and mended, horses are shod, and a large variety of work is done for other departments. Glasgow has long led the way in municipal development, and its communal services to-day touch the interests and affect the well-being of a greater number of citizens than do similar institutions in other cities. More than 10,000 persons are employed in the various departments of the Glasgow corporation, and all the common services have been municipalized, except the cemeteries.

Large Number of Public Markets

No fewer than 228 towns own public market places and halls within their boundaries, producing an aggregate annual income of $2,760,000 and a net profit in relief of taxes of $418,910. Liverpool's markets bring in an average yearly income of $160,095, and, when all outgoings have been paid, there remains a sum of $72,860 to be applied in aid of the taxpayer's burdens. Manchester owns 15 markets, which contribute an annual average sum of $75,000 in aid of rates. The ratepayers of Nottingham, Leicester, and Blackburn benefit in each town to the extent of $20,000 annually from their market places, while the markets of Norwich yield $15,850, of Derby $13,730, of Oldham $13,045, of Warrington $12,000, of Bolton $11,815, of Wolverhampton $10,995, and of Swansea $10,110 toward the rates, not to mention many others below $10,100.

Even the most determined opponent of municipal trading must admit the success that has attended the municipalization of tramways. In every instance where the control of a tramway system has been transferred from a company to the local authorities, the change has led to a better service, cheaper fares, increased traffic, and larger profits, while the position of the employees has been greatly improved in regard to pay and the hours of labor. We may take Liverpool as a type of many others. In 1897, the last year of the old company's management, the number of passengers carried was 38,409,084, the receipts were $1,453,715, and the mileage was 6,013,182 miles. In 1901, under the management of the corporation, the passengers had increased to 101,108,710, the receipts to $2,341,915, and the mileage to 10,970,063. After providing for interest, sinking fund, depreciation, and all working expenses, the sum of $88,035 was transferred in aid of the rates for the year 1901. In the following year the sum thus transferred was $125,825. The Leeds tramways, which were taken over by the city council in 1884, have for the last four years contributed an annual average sum of $204,380 in relief of rates, and the Hull tramways yield about $115,000 annually for the same purpose. The net annual profits earned by the tramways owned by corporations, and available for relief of taxation, are considerably over $500,000 and are increasing with great rapidity.

Gas More Profitable Than Electricity

The supply of electricity is a department of municipal enterprise which, in some towns, owing to many costly experiments, has not yet reached a paying stage, but in others a considerable profit is being made. Liverpool last year was able to make a contribution to the general rate of $60,145 from this department; and Manchester showed a net profit for the year ending March 31, 1902, of $38,175. Eight other English towns make an annual net profit, after paying interest and sinking fund, of over $5,000—namely, Leeds, $18,365; Nottingham, $18,125; Sheffield, $16,255; Bolton, $10,330; Southport, $7,730; Leicester, $7,090; Lancaster, $5,215; and Chester, $5,085. These examples would seem to show that, except where special and temporary circumstances exist, it is quite possible to make this department of municipal enterprise as profitable as any other.

One hundred and ninety-three towns have their own water supply, yielding an annual average net profit of $450,640. This does not seem a large return on a capital of $250,000,000; but it should be stated that the gross yearly profits are over $10,000,000, out of which an average sum of $7,600,820 is paid as interest on borrowed capital and $1,975,990 toward repayment of principal, both of which

sums would go to swell the dividends of joint-stock companies if the supplies were in their hands. To obtain a higher rate of profit on the water supply would necessitate a curtailment of the quantity supplied, which obviously would not be conducive to the health and cleanliness of the inhabitants.

Gas is a much more profitable commodity than water, as the 99 towns that own gas works make an average net profit yearly of $1,974,125 in all. The rates of these towns are thus relieved to a very considerable extent, the Manchester gas works contributing no less than $250,000 to this object; Salford, $121,625; Nottingham, $120,900; Birmingham, $114,065; Leicester, $108,725; and Bolton, $104,660.

MUNICIPAL TRADING

European and American Methods and Results Compared—The Views of an Advocate of Private Ownership of All Public Utilities

By Robert P. Porter

(Continued from May number.)

Depreciation Not Provided For

Then, again, the important question of depreciation is left out of account by most of the trading municipalities. They provide for the sinking fund on their debt, but renewals and depreciation of plant are largely neglected, so that it is more than probable that by the time the debts are paid off many of the undertakings will have to be "scrapped."

In order to make clear how little provision is made for depreciation beyond the sinking funds, the *Times* has had the following table prepared, showing for the undermentioned municipalities, (1) the total capital expenditure on remunerative works, (2) the average net profit or deficit for the three years to 1900-1, after meeting the service of the debt, and (3) the annual average provision for depreciation during ten years:

Corporation.	Total Capital Expenditure on Works.	Net Average Profit or Deficit After Meeting Service of Debt.	Average Annual Provision for Depreciation During Ten Years.
	£	£	£
Barrow	453,042	+ 8,798	None
Birkenhead	1,185,786	+ 17,483	15,218
Birmingham	9,315,501	+ 11,243	None
Blackburn	2,087,081	+ 3,947	None
Bolton	2,263,782	+ 35,680	12,597
Bradford	4,965,731	+ 15,332	6,969
Brighton	1,158,355	+ 11,763	4,497 in 1899
Bristol	332,573	— 627	None
Croydon	522,438	+ 6,466	None
Derby	739,612	+ 8,171	None
Halifax	1,837,469	+ 24,053	None
Huddersfield	2,311,554	+ 11,099	4,425
Hull	1,118,140	+ 12,860	340
Leeds	5,070,623	+ 44,546	None
Leicester	2,124,553	+ 40,321	200
Liverpool	8,175,918	+ 117,584	None
Manchester	*15,290,037	— 108,353	None
Northampton	403,440	+ 3,706	None
Nottingham	2,530,588	+ 49,790	2,087
Oldham	1,986,861	+ 14,869	None
Portsmouth	292,390	+ 1,916	None
Rochdale	1,183,855	+ 5,276	None
St. Helens	701,075	+ 9,150	None
Salford	1,415,891	+ 26,041	None
Scarborough (1899-1900)	261,887	+ 853	100
Sheffield	4,385,109	+ 21,465	9,384
Southampton	544,137	+ 3,313	None
Stockport	1,098,933	+ 10,054	None
Sunderland	344,656	+ 4,174	None
Swansea	758,563	— 8,906	None
Wolverhampton	490,313	+ 8,782	123
York	129,327	+ 995	None

* Including the loan to the Ship Canal, which cost upwards of £200,000 per annum in interest, etc.

In commenting on the above table the writer says:

"It will be observed that in many cases a provision of 1 per cent. for depreciation would more than wipe out the profits and leave substantial deficits. The worst of any figures of this kind is that all manner of important facts and financial juggling may be concealed behind them, and one has great difficulty in getting at the truth."

This is what may be called the "depreciation test," and unless a municipality can meet it fairly and squarely as set forth in the above table as well as the "debt" and "taxation" test it is of little avail to try and figure out the so-called "profits" of municipal trading.

Price of Securities Reduced

In an address to the Glasgow Chamber of Commerce Mr. Arthur Kay referred to the change in the taste of the investor for municipal loans:

"In 1896 Glasgow Irredeemable 3½ per cents. stood at 139½; they are now 118. Glasgow 2½ per cents. redeemable 1925—40 were 103¾ in 1896; now they are at 86. How's that for the credulous investor who believes in the 'unlimited security' put forward by the borrowing Corporation of Glasgow?"

Mr. Davies also touches on this phase of the question:

"The London County Council, which has the best, because the least burdened, of all the municipal securities, has just placed a 3 per cent. loan at less than 98½. Another large town recently made an issue of two millions of 3 per cent. stock at the price of 94. The public only subscribed for about 10 per cent. of the amount offered. There are other indications that several corporations have already felt the pinch of impaired credit. Some of the expedients to which they have been driven are at best questionable."

Extent of Municipal Trading

Having ascertained something of the cost of municipal trading and of the meagreness of the profits, it may next be worth while to see just what public utilities are being operated at present by the cities of the United Kingdom and how the service compares with that furnished by private enterprise in the United States. To begin with the gas supply, local authorities own 240 gas undertakings, with a capital of about $157,500,000 and supplying some 1,767,464 customers; companies own 453 plants, representing $357,500,000, with nearly two million customers. The fact is municipalities have not been so keen on taking over gas plants since the introduction of electric lighting. The water supply is under public control in half the municipal boroughs in the country, and in all but nineteen of the county boroughs. In some towns the policy of making profit out of the supply has been adopted; in others the American plan of exceptionally low charge has been adopted. We have nothing to learn or to copy from England in dealing with this branch of public utility. The water supplies of our large cities are, as a rule, better in quality, greater in quantity and much cheaper to the consumer than in Great Britain. The tramways of the United Kingdom are about equally divided between the local authorities and companies, the former owning seven hundred miles of lines and the latter about six hundred and twenty miles. With a few exceptions these tramways are not comparable either in equipment or service with the twenty thousand or more miles of line developed in the United States by private enterprise. The United Kingdom should have had by this time four or five thousand miles of first-class electric railways, and it would have had this mileage had it not been for the stifling effect of municipal trading. Two cities owned telephone undertakings—or did, for Tunbridge Wells has wisely sold its system to the National Telephone Company. Several million sterling has been invested in a vast scheme for housing for the working classes, much of which has been productive of harm instead of good. These seem to be the more important assets in the way of undertakings owned and operated by municipalities.

Comparisons Sometimes Dangerous

Comparisons, if not always odious, are generally dangerous, and when one attempts to make them between two countries like Great Britain and the United States there is always the risk of having all

your labor wasted in the general conclusion that perhaps after all English methods suit England best and American methods suit America best. The form of municipal government differs widely in the several geographical divisions of our own country, and this difference is even more accentuated when we come to compare the fundamental laws which govern British municipalities with the state laws under which our own cities are administered. At the best, then, we can only hope to make a few carefully selected comparisons under like conditions that would be of the slightest value. The attempt to do this even might prove disastrous, for there has already been so much quarrelling over details of municipal trading that we are beginning to lose sight of the important principles* involved. In short, it will be almost impossible to take up and compare the relative merits of individual enterprises in English cities with those of American cities. Such, of course, would make my paper, in the first place, unreadable; it would start a discussion on details instead of broad principles, and would not aid the Convention in reaching conclusions that will be helpful to those who are called upon to vote on the question.

Municipal Street Railways

It is further assumed that the American municipal trader has hardly travelled far enough along the road of municipal socialism to seriously discuss the taking over of the liquor traffic, the bakeries, the supply of milk, the pawnbroking business and the issue of municipal bank-notes. Perhaps for the present purposes it may be wise to confine ourselves to the productive industries, the management and control of which lies at the basis of the controversy now so actively waged in England—namely, tramways, gas, electric lighting, telephones and the housing of the working classes. I have purposely omitted the water supply from the above list, because it is so generally regarded in the United States as a legitimate function of municipal administration, and I have repeatedly suggested to my friends on the London County Council the wisdom of purchasing and managing the water supply of the metropolis before they undertake the hundred and one other things of minor importance which can, with proper regulations, be done so much better by private companies.

As by far the largest municipal development in Great Britain just now is in connection with the tramways, it has been deemed advisable to treat this branch of the subject as fully as possible. The last available Board of Trade report on tramways for the year ended March, 1901, shows that there were ninety-nine municipal street railways in the country, with a mileage of 700 miles; the capital expenditure upon these was over $70,000,000. The companies had 114 undertakings, with a mileage of 616 miles and a capital expenditure of over $52,500,000. Long before Great Britain is adequately supplied with electrical street railways the capital account will have increased to five hundred million dollars. Mr. Dixon H. Davies adds:

"But when that is done the enterprise must still progress. The capital account of a commercial concern cannot stand still. The railway capital of this country has increased about tenfold in fifty years. How can a lower factor of growth be taken for these not less important street railways? The authorities, therefore, will have to take their choice; either they must keep their people without modern locomotive appliances, or they must face an addition to the local debt on this account alone of at least four hundred millions during the next fifty years. It may be said there is a third alternative. They may not seek to supply the whole of the tramways which are wanted, but only such of them as private enterprise fails to provide. But this is an alternative which in the long run will not be found open to us. All experience shows that where a government undertakes a part of the service it sooner or later has to take the whole. The citizen will not go into partnership with the government; nor will the government permit him to compete with it."

Legislation Retards Development

Previous to 1870 only a few tramways had been built, and these had been promoted under the costly and cumbersome method of submitting a "private bill" to Parliament. To obviate unnecessary trouble, waste of time and expense, a bill was passed which enabled tramway promoters to apply directly to the Board of Trade for what is called a tramway "provisional" order. Such an order is practically a franchise and is provisional only in the sense that it has to be formally confirmed by Parliament before it can be acted upon. This arrangement was embodied in the Tramways Act of 1870, and so far as it simplified and cheapened procedure the act was fully welcome. In other respects, however, the act was not so well advised, since it established precedents which have hampered electrical enterprise to a degree not fully recognized by those who have not been engaged in the effort of carrying out tramway schemes in England. When the Tramways Act was drafted the government was in a most zealous reforming mood. The inspiration of this enthusiasm lay in the misdeeds of gas and water monopolies, which had taken a short-sighted advantage of the too liberal powers granted to them in former years. There was a strong demand that the public should be protected from similar abuses of power, and as tramways were in essence a monopoly, Parliament was naturally inclined to include protective measures in the act. This it did in two ways (1) by giving each local authority the right of vetoing any tramways scheme within its district, and (2) by imposing a tenure of only twenty-one years on tramway concessions, and giving each local authority the power of purchasing the undertaking at scrap value (otherwise called "old iron" or "marine store" prices) when the period of tenure was at an end.

It is safe to say that the government had no anticipation of the actual effect which these provisions would have on the future of the tramway industry; and it is equally safe to say that the government of the present day has made but slow effort to improve matters now that the unfortunate incidence of the veto and the conditions of tenure have been felt over and over again. The attempt to regulate the powers of railway companies in the public interest led to restrictions which were excessive, and so defeated its own intention by retarding the development of an important public service. In justice to the government it must, nevertheless, be admitted that the full strangling influence of the Tramways Act was not felt until many years after 1870; indeed not until the dawn of electric traction as a commercial possibility. That was about 1890—twenty years after the passing of the act—and close upon the time when numerous tramway orders were expiring. At the same period, moreover, the important movement of municipal bodies in the direction of trading enterprises had already begun and was making steady strides in popular favor. In the coincidence of these three things—one legislative, one industrial and the third social—one finds the cause of the present condition of electric traction in England.

Progress Hindered by Short Franchises

To understand how this trinity of causes co-operated to put back the tramway clock in England for several years, all that is necessary is to consider the position of a tramway undertaking which, in the years from 1890 onwards, was approaching the end of its period of tenure. Confronted with the fate of expropriation in a few years' time at the then "market value," with no allowance for goodwill or compensation for compulsory purchase, anything like fresh capital expenditure on the undertaking was out of the question, and the efforts of the managers were naturally concentrated on reducing expenses and husbanding revenue, so as to meet, as far as possible, the inevitable capital lost through the sale of the undertaking at old iron prices. The unhappy effect of the limited tenure arrangement was to force tramway undertakings into a premature condition of senile decay. No money (except what was absolutely necessary) was spent on the renewal of rolling stock or permanent way—the cars were even grudged fresh coats of paint and the conductors' new uniforms and new sets of brass buttons, so dear to the

* The object of this Convention, as I understand it, is to discuss as fully and fairly as possible municipal ownership and public franchises. Speaking generally, the methods of dealing with public utilities in England and in the United States differ fundamentally. This divergence is so great that it seems to me the Convention will simply waste its time if it plunges into an analysis of comparison of the budgets of municipal and company street railways, gas and electric plants, either as we may find these enterprises comparable in England and in America, or as we may find it possible to make comparisons between the two countries, until the broad question of the two distinct methods of dealing with such public utilites has been carefully examined and considered.

heart of the public. The service of cars was limited as far as possible; extensions were not to be thought of; and, in short, enterprise as it is generally understood was a business absurdity. The last years of a tramway company were, therefore, years of insufficient and inefficient service. The public grumbled. They called upon the tramway companies to electrify their systems—a vain demand when there was no promise of renewal of tenure for even another twenty-one years. As the undertakings would soon fall into the hands of local authorities, it was natural that public opinion should turn to them for reforms which were apparently unreasonably refused by private companies.

Municipalities Slow to Advance

This turn of public opinion was not made in vain, and it has placed the development of interurban electric traction in a position from which it will probably not emerge for a considerabe period. One municipality after another took over its local tramway system when the period of tenure was concluded; and one municipality after another decided to adopt electric instead of animal traction. This latter change was not carried out, however, with anything like rapidity. Even the most progressive of municipalities and those most enamored of trading projects (such as Glasgow) dilly-dallied over the problem of conversion for a quite unnecessary period; and in the hands of local authorities the progress of electric traction has been extremely slow. Although their new found sphere of municipal trading was very attracive, they were at that time extremely cautious about embarking public money in speculative enterprises. When the bold few made the plunge the others followed gradually, according to the fashion of municipalities. There was no inclination to run even the most elementary of risks, and hence the local authorities did not altogether redeem the electric traction industry of England from the reproach of backwardness.

As far as interurban electric lines are concerned, the part which the local authorities played for many years was practically *nil*. Each local authority thought only of its own district, as it was naturally inclined to do. Not until the example of other countries was considered, combined with the successful exploitation of some interurban systems by private enterprise in England itself, did the local authorities begin to realize that the conversion of tramways to electric traction did not merely enlarge the carrying capacity of the old systems, but greatly enlarged the area over which the tramway system should, in the public interest, extend. With horse traction the limits of each local authority were roughly the limits of economical working. With electric traction the parish became a mere item in a comprehensive system, which might extend over a whole county.

Private Enterprise Sets the Pace

It remained, therefore, for private enterprise, in the face of discouraging legislative conditions and the opposing trading ambitions of municipalities, to demonstrate to the public the value of those extensive interurban systems which electric traction had rendered possible. The efforts of private capital towards this end were directed through two channels. In the first place, old tramway undertakings (those approaching the end of their tenure) were acquired in the hope or the promise that the local authorities concerned would defer purchase until the end of a certain period, or grant a lease to the company. In the second place, extensions are promoted as links in a comprehensive system. In both these operations private enterprise was materially assisted by the operation of the Light Railways Act of 1896, a measure about which I shall presently say more, as it introduced a new element of opposition to the extension of interurban systems. It will, therefore, be clearly observed that private enterprise in English street railway undertakings has had more difficulties to contend against than in America. It has practically been kept out of the rich districts by the cities taking over the plants for a song at the end of short leases, while the virgin districts in England which are worth anything are few and far between.

In some cases—and I shall not weary you with the details of these districts, but refer you to a recent article which I contributed to the *American Street Railway Journal*, entitled, "Electrical Traction in United Kingdom"—private enterprise has been allowed to link up tramways in areas where the local authorities could not agree as to which particular local authorities should manage the enterprise. In such cases, it would be impossible for me to give an American audience an idea of the difficulties—mainly of a diplomatic character which have to be overcome. Each local authority had to be separately considered, its opinions, its prejudices and its ambitions carefully studied. Each of the local authorities, it should be remembered, had the absolute power to veto any of the schemes of the tramways company for the renewal of tenure, and each of them had to be separately persuaded not to use this power. The history of such undertakings in England illustrates the difficulties involved in arranging inter-communication facilities between neighboring systems owned respectively by companies and local authorities. The municipal systems occupy for the most part the areas of densely populated towns; and their owners have naturally a tendency to regard them as self-contained, and, therefore, superior to outlying systems.

Municipality vs. Municipality

From the present state of municipal opinion with regard to private enterprise, it seems utopian to expect the initiative of better things from local authorities themselves. The necessity for free inter-communication between neighboring tramway systems is already a truism among electrical traction companies; but local authorities, not being business organizations, do not treat the question on the same broad commercial lines. There seems every reason to anticipate that the local authorities will not, save in rare cases, be readily induced to arrange running powers with tramway undertakings touching their borders. The public interest, nevertheless, demands it, and points to the necessity of altering the law in order to achieve it. When two neighboring railway companies do not agree to running powers for which there is clear public necessity, Parliament can enforce mutual working arrangement, and common sense requires Parliament or the Board of Trade should have the same power to force inter-communication where various tramway systems are contiguous.

The parochial spirit of municipalities has been evinced in their dealings with each other, perhaps more strongly than in their relations with companies. Next-door neighbors are not always the best friends; and municipalities are in this respect very human. The natural pride of each of them in their municipal achievements has an obverse in the natural jealousy of the achievements of others. There is no necessity to dwell on this well-known aspect of municipal life, but it must, at least, be referred to in order to explain why municipalities have not done much to develop isolated tramway systems into interurban networks. The old familiar difficulties of getting several local authorities to work harmoniously together in a drainage or water scheme are experienced again in connection with tramways. They are, indeed, exaggerated beyond their usual intensity, because questions of profit on municipal outlay are involved in mutual traction and enterprise. In this matter, also, local authorities are conspicuously human.

One of the most striking examples of the failure of municipalities to come readily to a working tramway agreement was afforded by Salford and Manchester. These two towns, numbering about 700,000 souls together, are really a single town; the boundary line is purely artificial, and it is a common saying that you cannot walk two steps in Manchester without treading on Salford. In such a situation it would be the height of folly to have two isolated tramway systems. The corporations are in this case the tramway owners, and they readily enough admitted that free inter-communication was an immediate practical necessity. Time after time, however, they vainly endeavored to arrange the terms of running powers. Manchester's were objected to by Salford as inequitable; Salford's proposals were objected to by Manchester on similar grounds. Committees were formed by each corporation, reports were drawn up, discussed, submitted to the neighboring corporation and rejected. The press took the matter up, and for more than two years the corporations discussed the matter without coming to any settlement. In the end Manchester decided to apply to Parliament for the necessary running powers.

The corporation of Glasgow is experiencing considerable difficulty

in making the necessary arrangements for the extension of its municipal system of tramways to the neighboring shipbuilding centre at Clydebank. Leeds and Bradford, which are only eight miles apart, are debarred from inter-communication because they could not agree to adopt the same gauge for their municipal tramways. Leeds chose 4 feet 8 inches and Bradford 4 feet.

In addition to this criticism "by results," there are many objections to be urged on the grounds of inexpediency and of principle to any local authority carrying on trading operations in the areas of neighboring authorities, as must be done if municipalities are to become promoters of comprehensive systems of electric lines. Whether the ratepayers of A should be taxed to provide tramways for B, and whether the pennies paid by the public to B should be applied to relieve the rates of A—such are the questions opened up as soon as a local authority trades beyond its border. And all the arguments against municipal speculation within the limits of each area become emphasized when the area is overstepped. Experience seems to indicate very clearly that in the majority of cases the municipal control of a tramway system implies an obstacle to the development of the system to become part of an extensive interurban system. It will be particularly interesting to me to hear how those of my own countrymen who favor municipal ownership regard this sort of playing at modern locomotion. How, with such restrictions as these and such local interference, we could have established the great interurban street railway systems centring in Boston, Chicago, Detroit, Pittsburgh and Cleveland, to say nothing of New York and a dozen other cities which will at once suggest themselves, I do not know. Could anything but private enterprise have linked up Minneapolis or St. Paul? I think this phase of municipal ownership deserves special attention, for herein it shows one of its greatest weaknesses.

Light Railways Act

The Light Railways Act of 1896, already referred to, has not turned out an unmixed blessing for British tramway enterprise, especially when it was pushing over wide areas and linking up small towns as we do in the United States. It has proved a good friend of electrical traction industry, although it has not realized all the hopes which were entertained upon its first appearance. As no definition of a light railway was given in the act, the simple and rapid procedure provided was largely taken advantage of by tramway promoters in seeking powers for interurban lines. Its provisions were more favorable to free enterprise than those of the Tramways Act of 1870, but as the old act was not definitely repealed, the Light Railways Commissioners felt obliged to interpret the new act in the spirit of the old. Hence the power of the municipal veto remained active under the Light Railways Act, although the act did not specially grant the power of veto; and the principle of limited tenure remained, although the act contained no definite instructions in that point. The situation was so anomalous and was productive of such frequent disappointment in the case of thoroughly sound schemes that the revision of the Light Railways Act has become almost imperative.*

The particular clause in the Light Railways Act which gives the railway companies a lever for opposition reads as follows:

"If the Board of Trade, on such consideration, are of opinion that, by reason of the magnitude of the proposed undertaking or of the effect thereof on the undertaking of any railway company existing at the time, or for any other special reason relating to the undertaking, the proposals of the promoters ought to be submitted to Parliament, they shall not confirm the order."

"Submitted to Parliament" means that the schemes shall be embodied in a private bill passed through all the expensive process of Parliament treatment. The railway opposition is then considered "on its merits" in theory only, since the natural tendency of Parliamentary committees is to protect the vested interests of the railway companies. In actual practice, scheme after scheme has been rejected by the Light Railways Commissioners on the ground of railway opposition. Only in certain cases has the procedure by private bill been either feasible or successful.*

These facts all tend to show that outside the Metropolis private enterprise desirous of building, equipping, maintaining and operating tramways or street railways has had anything but an easy road to travel. It may be fair and just, therefore, to remember this before we institute any comparisons between the splendid achievements of private enterprise in the United States which has been encouraged by liberal rather than discouraged by illiberal legislation.

The Situation in London

The situation in the Metropolis differs materially from that of the town outside, and the announcement is made to-day (February 7) of the appointment of a Royal Commission to inquire into the means of locomotion and transport in London. The Commission will find the situation complex.† London, with an area of one-fifth of 1 per cent. of the United Kingdom, contains 15 per cent. of the population. The county of London, at the last census, had a population of 4,536,524; Greater London had a population of 6,581,077. The administrative county of London, comprising a portion of the ancient counties, Middlesex, Surrey and Kent, has an area of 74,823 acres. Greater London, or the Metropolitan Police District, includes the counties of London and Middlesex, and part of the counties of Surrey, Kent, Essex and Hertfordshire, representing an area of 443,421 acres. In studying the problem of London locomotion these two distinct areas must be kept in mind, as well as a constantly growing area extending in almost every direction from the Metropolis for a distance, say, of thirty miles from the centre, into districts being rapidly settled by people whose occupation or business is in London, and the continued harmonious growth of these parts must in a large measure depend upon the means provided for rapid transit from the city to these outlying districts.

There has been a good deal of old-time private enterprise shown by the railways centring in London in handling passenger traffic quickly and cheaply. Take, for example, the Great Eastern Railway, which handled last year the amazing number of 91,740,654 passengers in their four London stations, Liverpool street, Bishopsgate street, Bethnal Green and Fenchurch street. The North London Railway, on less than twelve miles of line, carried 42,000,000 passengers, about 27,000,000 of whom centred at Broad street. The London and South Eastern, and Chatham and Dover, combined, nearly reach an aggregate of 60,000,000. The London, Brighton and South Coast had nearly 28,000,000 for London Bridge and Victoria. The London and South Western can boast of 30,000,000 passengers to and from Waterloo last year. The Great Northern system, including season tickets, handles 34,000,000 passengers annually. These are prodigious figures when applied to the steam railway, which is fast becoming a clumsy and cumbersome machine in the transportation of urban passengers. That some of these railways have reached the point where they can carry no more passengers on existing tracks, or that the demand of population has become so enormous that these millions can no longer converge and radiate at these points is not surprising, and certainly the railway companies themselves are not to blame.

For the county of London population, something under five millions, Mr. Kinnear has estimated the traffic in 1900 at 1,273,500,000. This gives 400,000,000 for railways, tubular or otherwise; for the omnibuses, 500,000,000; tramways, 300,000,000; hackney carriages

*At the present moment the government possesses a new Light Railways Act, which will be put before Parliament for consideration "at the earliest opportunity." That may be this year, but more probably it will be next year. As the provisions of this new act are still private, it is impossible to guess how far they will assist the progress of electrical traction. Nevertheless, the president of the Board of Trade has publicly stated that the proposed act contains an acceptable compromise on the crucial question of the absolute veto hitherto possessed by the local authorities. That is at least one step in the right direction, and, as such, is something for which to be grateful. But unless a more radical reform than that is effected by the bill, it may prove ultimately to be a stumbling block by containing just sufficient progressive qualities to give the appearance of improvement, yet not sufficient to make it anything like permanently useful in the cause of progress.

*For at time it seemed as if the attitude of the railway companies was about to prove as serious a stumbling block to the construction of electric traction systems as the obstacles interposed by reactionary municipalities. Fortunately, there are signs of a change in the attitude of the railway companies. From their first natural feeling of uncompromising opposition they are apparently passing to a better comprehension of the true functions of the tramway in relation to the railway.

†In a series of articles in *Traction and Transmission* for September, October, November and December, 1902, I have gone more fully into the situation than it is possible to do here.

and steamboats, 73,500,000. The following, however, is a more recent, and I think more accurate, estimate for 1902:

	Passengers.
Suburban railways	618,000,000
Tubular and underground railways	264,000,000
Tramways	390,000,000
Omnibuses	530,000,000
Cabs, etc.	30,000,000
Total passengers carried in 1902	1,832,000,000

At the present time, within the one hundred and twenty-one square miles of superficial area comprising the county of London, including the tube railways in operation, there is a total length of line of 228.45 miles and no less than 273 railway stations.

Turning from railways, steam and electric, to tramways, I find that the London County Council and eleven companies have running-powers in the county of London. The total length of lines within the county, according to the latest available official report, is 115 miles; and the length of line belonging to the companies which extends beyond the county boundary is nearly 32 miles. The London County Council owns 72 miles of line, 43 miles of which, situated on the north side of the Thames, are at present worked by the North Metropolitan Tramways Company, while the 24 miles on the south side of the Thames, purchased January, 1899, is worked by the Council itself.

Thus, without considering for the moment the railways and tramways outside the county of London, we have in round numbers 343 miles of lines over which 700,000,000 or more passengers must annually pass.

(To be continued.)

MUNICIPAL LIGHTING FOR NASHVILLE

The Result of Mayor Head's Persistent Effort—One of the Largest Plants in the Country—Its Operation Successful

By Our Special Correspondent

USUALLY the first public utility that a city takes over from private management is the water supply. That comes nearest the absolute needs of a city, but as the success in its management is demonstrated, citizens turn their attention to other, probably less necessary, but still greatly needed, public service. After a supply of good water, the lighting of the streets comes to be a public necessity and the usual high prices charged by private companies for this service forces people to desire the city ownership of this utility. This has worked out in the city of Nashville, Tenn., with the happy result that the city is the possessor of not only its own waterworks, but also its electric light plant, although the latter has not served a year of usefulness.

When Mayor James M. Head decided to run for the office in which he is now serving his second term, he announced that he was in favor of municipal ownership of public utilities and that he would use his best endeavors to secure to the city at least a municipal lighting plant to illuminate the city's streets. The operation of the waterworks under city management had been successful and the public ownership of the electric plant was next in order. In the start of Mayor Head's investigation looking toward a municipal light plant, he found that the charter of the gas company was about to expire and he was successful in having the price of gas reduced from $1.50 a thousand cubic feet to $1 in return for a new franchise for only twenty-five years. In addition, the city was to have the right of purchase within ten years and the company was to pay the city yearly five per cent. on its gross earnings. The acceptance of these conditions proved that a good profit could be made by the company when the price of gas was reduced one-third. From this it was readily argued that the charges of the electric company were exorbitant and this caused new efforts to be taken for a municipal plant.

MAYOR HEAD'S FIGHT FOR THE PLANT

Mayor Head found that in 1891 the Legislature of the State had granted the city the right to issue $150,000 bonds to build and operate a municipal electric light plant and the right had been reserved by the city previously to string its wires on the poles of the old company. Backed by this knowledge, the Council was urged to begin the construction of an electric lighting plant. This was in 1899, and for nearly three years a fight was waged for the plant. Strenuous efforts were made by interested parties and opponents of the idea to prevent the project from being accomplished, but at last the fight was won and the Council decided to erect the plant. The Legislature had been induced also, after a fight, to allow the city to sell electricity. This has not yet been done on the advice of the Mayor, inasmuch as the Cumberland Electric Light & Power Company, which held the contract for street lighting, offered to surrender its contract when the city plant was in a position to take over the work. This month, however, the contract expires, and if the company will agree to sell electricity at a reasonable price to consumers,

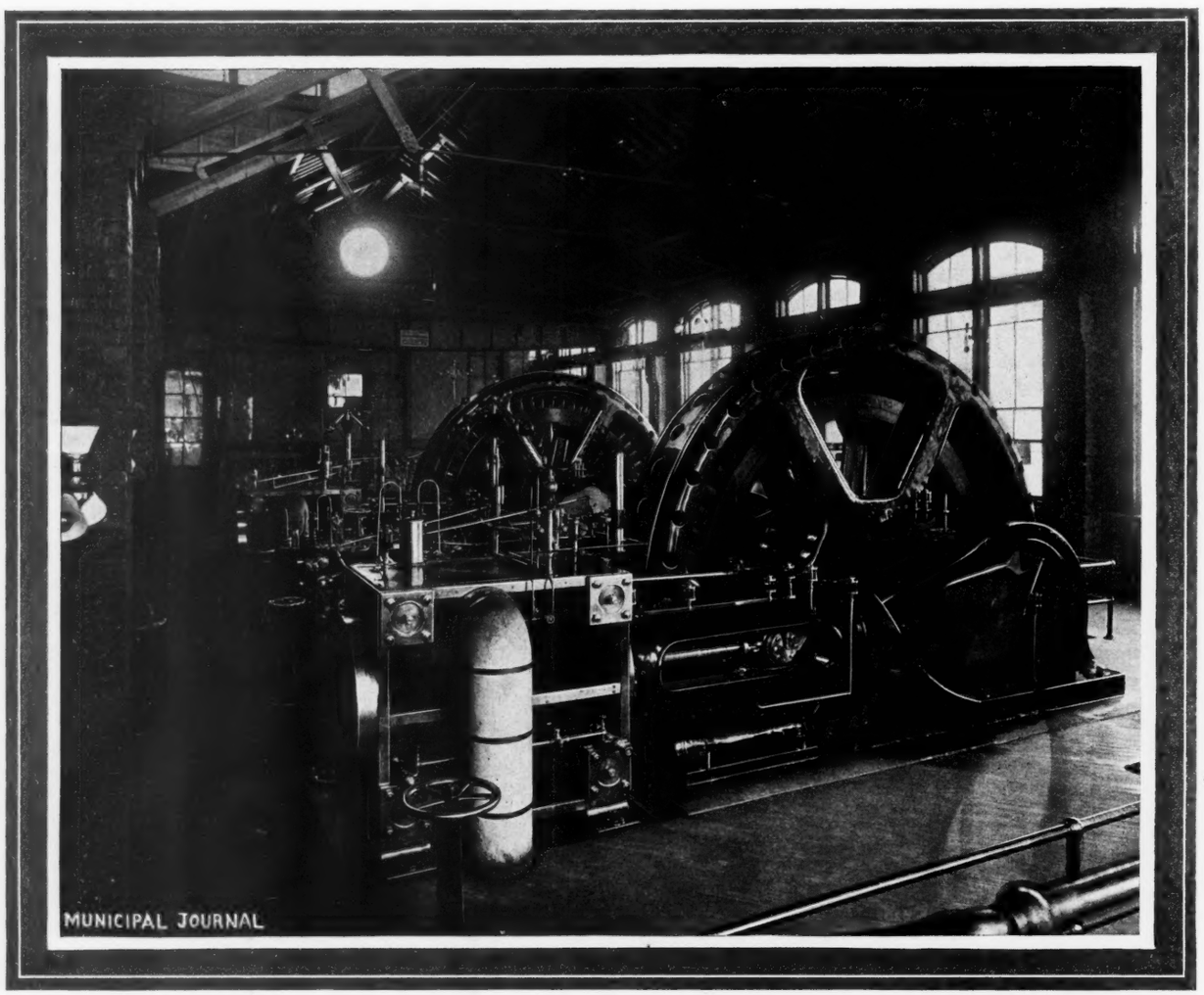
WESTINGHOUSE TRANSFORMERS IN NASHVILLE'S LIGHTING PLANT

Mayor Head feels that the city should not go into the business of furnishing electricity commercially. Had the company been far-sighted, it would have offered to light the streets free of charge, for then the electric plant would never have been built and the city would not have come into competition with the company in a commercial way. The moment the municipal plant was an assured thing, the electric company reduced the price of electricity from 18 to 12 cents per kilowatt, reducing its income $66,666.66 a year, and, as it cost the city but $44,000 to light the streets with both gas and electricity, the company could have afforded free street lights to have kept out the city plant. This reduction in the cost of electricity to the private consumer is only one of the many benefits derived from the introduction of the light plant of the city.

fore by the private company. Everything worked to the entire satisfaction of the officials who had striven so long to accomplish this object.

Description of the Plant

The electric plant was designed by Professor Charles S. Browne, of Vanderbilt University, and he had entire supervision of the interior of the plant. The exterior was constructed under the direction of the present Superintendent, Mr. J. W. Pentecost. The boilers were the first apparatus to be erected, and Mr. Charles Johnson, who represented the Babcock & Wilcox Boiler Company of New York, took charge of this work. Two boilers were installed and each are of 400 horse-power. One of the accompanying illustrations shows these boilers in connection with the Hawley Down-Draft furnaces.



THE BULLOCK ALTERNATORS IN NASHVILLE'S MUNICIPAL LIGHTING PLANT

The date of the formal acceptance of the municipal plant by the city will long be remembered by the citizens of Nashville. As a fitting celebration of the event, the historic old State Capitol had been strung with incandescent lights, and when the power was turned on, the contour of the old building was outlined against the sky. A large assemblage of public-spirited citizens listened to a number of speeches by prominent men, including Mayor Head and Governor McMillin. For some time previous to this the contractors, T. J. Mooney & Company, had been running the plant to insure of its proper working before the city took charge, and on September 3, last year, Mayor Head and members of the Board of Public Works took part in testing the system of street lights by turning on the current from the municipal plant in substitution for that supplied thereto-

Above in the engine room were installed two Hamilton-Corliss engines of 750 horse-power each. Direct connected to these are the two Bullock alternators of 400 kilowatts each, which were put in by the Bullock Electric Company of Cincinnati, O., under the supervision of Mr. William Newberry. Mr. Thomas J. Mullen, one of the above company's electrical engineers, conducted all the tests and had entire charge of all electrical apparatus until the plant was received by the city. The Henry Worthington Company supplied all the pumps and condensers.

The switchboard was built by the Wagner Electric Company of St. Louis, which also supplied the station transformers. The transformers on the outside lines were furnished by the Westinghouse Electric & Manufacturing Company of Pittsburg, and are of the

style known as "Type N." The 600 or more arc lamps were made by the General Incandescent Electric Company of New York.

Cost of Construction and Operation

As originally planned, the cost of construction of the plant was placed at $140,063.73. The grounds and buildings cost $28,305.14, while the equipment of the station, including 500 arc lights, amounted to $93,978.50. The amount estimated to supply the line wire, poles, equipment for the arc lamps, labor, engineering, etc., was placed at $17,780.09. The additions made to the plant after its installation brought the sum total of cost up to $153,980.66, among the items included in the additional expense being $6,573.60 for transformers, arc lamps and equipment.

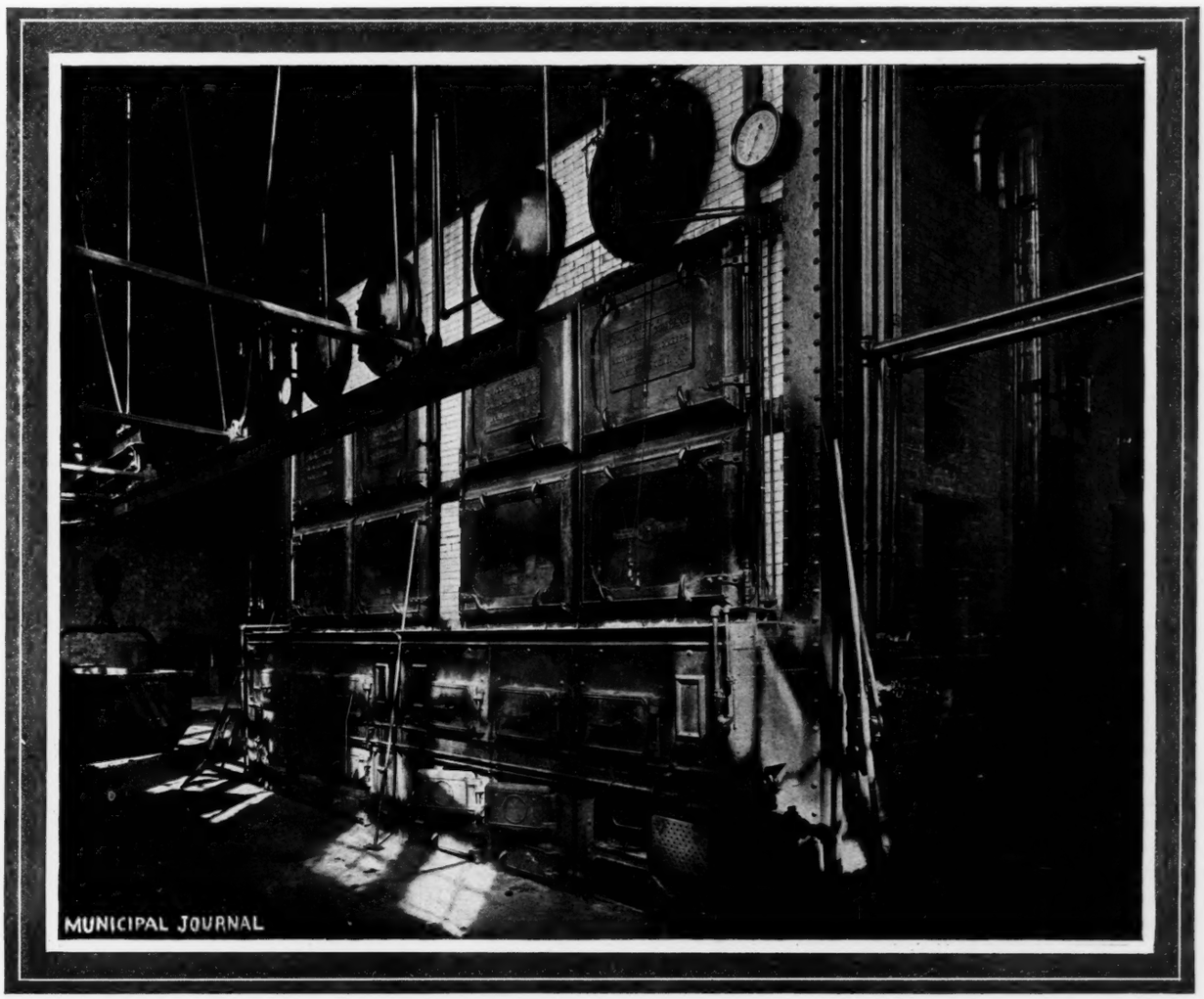
The first report of Superintendent Pentecost covered the operation of the plant for the months of October, November and December last. From it it appears $3,796.25 were spent in salaries, $2,100.34 went for coal, $147.25 for insurance, $5,000 for interest on the bonds up to January 1, 1903, and the rest for supplies for the station and line. The total cost of operation for the three months amounted to $12,061.80.

During these three months the station supplied current for 510 arc and 1,271 incandescent lamps. When the contract with the Cumberland Electric Light & Power Company was in force, there were only 382 arc lights on the streets, but upon the introduction of the municipal plant, over 500 lights were at once placed in service. This number will be added to as fast as the needs of the city demand. Inasmuch as the initial equipment of the plant could supply three times the amount of energy required by the present service, it will be seen that no additions in the way of machinery will have to be made for a long time. One of the two units will be held in reserve so that, if any accident should occur to one, the other will be ready and the city would not be placed in darkness. Space has also been provided in the station for another unit equal to both of those now in service, so that the station itself will not have to be enlarged for many years. The output of the plant for the three months was 370,000 kilowatts and the cost was estimated at .0326 cent per kilowatt.

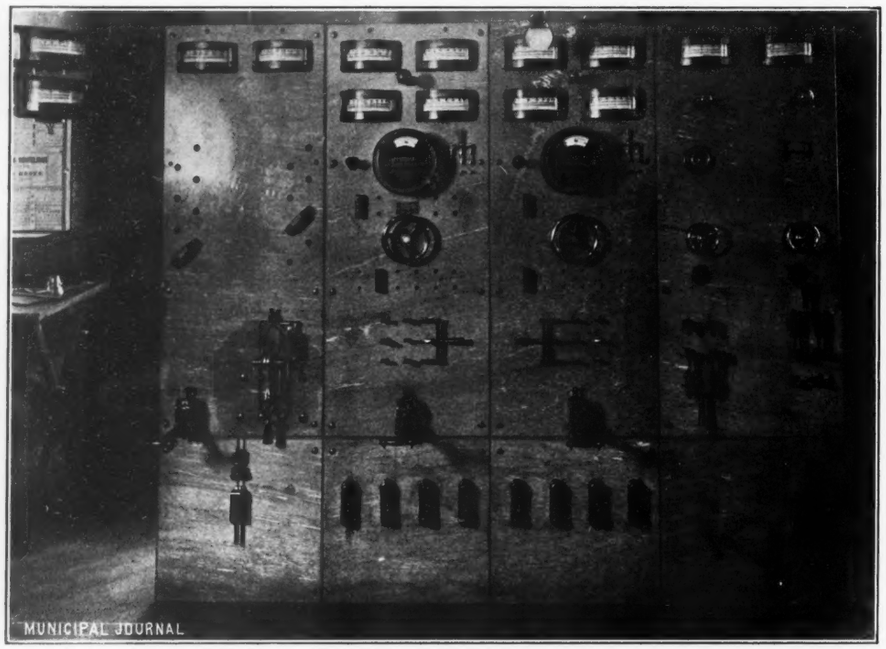
Plant Proving a Success

The marked superiority of the new installation over the old has been demonstrated in many ways. The lamps used by the private company were of the old-fashioned open-arc variety, while the city has put in nothing but closed arcs with their greater power of illumination and absence of dark shadows.

The lighting of the Capitol will require over 1,000 incandescent lights, a load on the plant that is not normal and would not be required of the average municipal lighting plant. The gas lights long in use in the city will give place to incandescent electric lamps. It is too early yet in the life of the plant to demonstrate with exactness the cost of the lights, but the estimates show that, with a liberal margin for miscalculations, nearly $5,000 will have been saved the city over the price paid the Cumberland Company on its contract. In addition to this saving, which will probably prove much larger when the real figures are known, the forced reduction in the price



BABCOCK & WILCOX BOILERS AND HAWLEY DOWN-DRAFT FURNACES IN THE LIGHTING PLANT



SWITCHBOARD BUILT BY WAGNER ELECTRIC COMPANY, OF ST. LOUIS

of commercial electricity charged citizens by the private company should be credited to the municipal plant, for, as Mayor Head has asserted, this would not have occurred had not the municipal electric plant been installed. The reduction in the cost of electric current to citizens as compared with the old price would pay for the municipal plant within two years even if that plant were never operated.

While the municipal plant has not been running long enough to judge of the exact cost of supplying lights, the approximate cost may be compared with what other cities in the same class are paying for lights. There are thirteen cities in the United States having populations running from 70,000 to 90,000; in only two are the electric lighting plants owned by the cities. These are Grand Rapids, Mich., and Nashville, Tenn. The former has a population of 87,565, and the cost of its plant, installed in 1900, was $185,000. Since then additions and improvements have been made that bring the cost to $194,000. This plant has a capacity of 900 arcs of 2,000 nominal candle-power, of which the city uses 597. None are used in a commercial way. The lights are burned 3,650 hours and the cash cost of each is placed at $39.27. Taking into account interest and depreciation at 7 per cent., the total cost of each lamp is $62.01 per year. Of the other cities in this group, Atlanta, Ga., pays $82.50 per year for her arcs supplied by a private company on an all night, every night schedule. Camden, N. J., has a population of 79,935, and is supplied by a private corporation with arc lights at a cost of $120.45 per arc for a similar schedule. Lights in Hartford, Conn., are owned by a private company and the city pays $75 a year for all night service. Portland, Ore., is supplied with long service lights for the sum of $64.32, the power being supplied by water. In both of these cities the service is satisfactory to the city, and in Hartford is fairly low for private service.

MUNICIPAL INSURANCE SCHEME STARTED

THE scheme of municipal insurance outlined in part in the April issue of THE MUNICIPAL JOURNAL, has been started under the name of "The Municipal Mutual Insurance, Ltd.," and seventeen boroughs have agreed to join in carrying out the idea. The present insurances of these boroughs amount to about $15,000,000. Other boroughs have asked for particulars of the scheme and will, in all probability, join.

Delegates from the boroughs will compose the board and will be registered without capital or shares, only a mutual agreement being concurred in. At the present time above $25,000 individual risks have been underwritten such that absolute safety will be accompanied by a growing reserve fund of more than half the present premiums. The following will give an idea of how the scheme has been thus far planned:

These municipalities of London have combined in a mutual insurance scheme and have taken $15,000,000 worth of insurance at premiums amounting to about $15,000 a year. The company mentioned above is to carry out, without capital or shares, this scheme, a mutual agreement of the contracting parties to undertake the payment of losses incurred by any member being the basis on which the insurance is to be paid. While fire insurance will be the only thing at present undertaken, other risks will be added in the future.

Each party agrees to continue insuring for five years, the premiums to be increased or decreased as the results show, together with a safe margin to ensure reimbursement in case of unusually heavy losses.

Underwriting arrangements have been made with underwriters having a capital of over $27,500,000 and, as the Board has decided not to place more than $25,000 on any one property, the greatest possible loss would not take more than two years' premiums to pay. Large profits are allowed the Board by its underwriters and it is calculated that one-half the premiums will be available for a reserve fund, the growth of which will allow of premiums being reduced.

The reserve funds will be invested in municipal bonds. Each municipal authority insuring over $50,000 will have the appointment of one of the trustees to manage the Board. They will serve without pay and can appoint a few managing trustees and, at general meetings, each policy holder representing $50,000 of insurance can have a vote for each $50,000 and each authority is to be on equal terms with the others.

No dividend or profit is to be paid to any member of the Board, the object being a gradual reduction of premiums until the minimum is found—supposed to be 8 cents on the $500 insured. No liability is incurred by any trustee except a possible $50 in case the Board is abolished to cover the expenses of it.

All policies are to be taken over upon the same premiums and conditions regarding commissions as those now existing and new insurances will be assessed at the lowest rates paid for other risks. One policy will be issued to each authority that insures, but on it will be entered a schedule upon which will be placed each risk as it comes into the scheme and all premiums are to be made payable on one date by one check. This will avoid undue clerical work and keep down the expenses.

The sum of $15.28 must be paid by each authority entering into the scheme. This is to cover the expenses of registration, etc., and will be allowed from the first premiums.

As told in the April issue, Shoreditch had been working on this matter of municipal insurance for some time, but the opposition in Parliament prevented the passage of an act allowing the London authorities to form an insurance fund. Consequently this Board for mutual insurance has been formed and it can act without permission of Parliament. While the larger the number of parties insuring the quicker will be the formation of a reserve fund, the scheme will be just as safe if only a few join, although the smaller the number the higher the sum to be underwritten.

PENNSYLVANIA'S NEW GOOD ROADS LAW

Era of Improved Highways Opened—State Highway Department Established—Towns, Counties and State Will Join in the Good Work—To Spend Six Millions

The Legislature of Pennsylvania has passed the Sproul bill for the purpose of constructing good roads throughout the State under State supervision. The following is the bill in full, which will be of interest to all good roads advocates and others who recognize the importance of good highways:

AN ACT

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same that, immediately upon the approval of this act, a state highway department shall be established by the appointment of the Governor of the Commonwealth, with the advice and consent of the Senate, for a term of four years of a state highway commissioner, who shall be a competent civil engineer and experienced in the construction and maintenance of improved roads. Said state highway commissioner shall receive a salary of three thousand five hundred dollars per annum, and shall be allowed his actual travelling expenses, not exceeding five hundred dollars, while officially employed. He shall furnish a bond in the sum of twenty-five thousand dollars for the faithful performance of his duty, said bond to be approved by the Governor, and he shall give his whole time and attention to the duties of his position. The said state highway commissioner may appoint, as the work of the department requires it, and subject to the approval of the Governor, one assistant who shall be a capable and competent civil engineer and experienced in road building; who shall receive an annual salary of two thousand dollars, and shall be allowed his actual travelling expense, not to exceed five hundred dollars when on official business, and he shall also appoint a chief clerk at an annual salary of fifteen hundred dollars per annum, and may employ an additional clerk, who shall be a competent stenographer, at an expense not to exceed one thousand dollars per annum. The state highway commissioner may require the employes of the department to give bond for the faithful performance of their duty in suitable and reasonable amounts.

Section 2. The state highway department shall be provided with suitable rooms in the State buildings at Harrisburg, and its offices shall be open at all reasonable times for the transaction of public business. The state highway commissioner shall carry into effect the provisions of this act and all acts of Assembly providing for the cooperation of the State in the construction and maintenance of public highways. He shall have charge of the records of the state highway department, and shall each year submit to the Governor of the Commonwealth a full report of the operations of the department, the number of miles cost, and character of the roads built under its direction, detailed statements of the expenses of the department, and such other information concerning the condition of the public roads of the State and the progress of their improvement as may be proper.

DUTY OF STATE HIGHWAY COMMISSIONER

Section 3. Whenever the county commissioners of any county shall represent by petition to said state highway department that any principal highway in said county outside of the corporate limits of any city or borough is not in a satisfactory condition for comfortable or economical travel, and ought to be reconstructed under the provisions of this act, and shall furnish to the said department an accurate plan of the layout lines profile and established grade of such highway, it shall be the duty of the state highway commissioner to examine such highway, or instruct one of his assistants so to do, and, if in the judgment of the state highway commissioner said representation is well founded, he shall determine what changes should be made in said existing highway, what portion of it should be improved and in what manner, and shall prepare accurate plans and make careful detailed estimates of the expense of the work which in his opinion should be done, and report the same to the county commissioners of the county and the supervisors or commissioners of the township or townships in which the said highway may lie. If the said county commissioners and township supervisors or commissioners then decide that it is advisable to go on with the work as herinafter provided, and make the required agreements as hereinafter specified, the state highway department may, if the funds at its disposal permit of so doing, contract jointly with the county and township or townships in which said highway lies, to carry out the recommendations of the state highway commissioner; the cost of the same, including all the necessary surveys, grading, material, construction, re-location, changes of grade, and expenses in connection with the improvement of said highways to be borne, in sixty-six and two-thirds per centum by the State, sixteen and two-thirds per centum by the county, and sixteen and two-thirds per centum by the township or townships in which the portions of said highway improved, as herein provided, may lie: Provided, That the State aid shall be apportioned among the several counties of the Commonwealth, according to the mileage of township or county roads in each county, but the said amount shall remain in the State Treasury until applied for under the provisions of this act, and provided that any county constructing county roads under the provisions of the act of June twenty-sixth, one thousand eight hundred and ninety-five, pamphlet law three hundred and thirty-six, and supplements and amendments thereto, shall be entitled to receive the same amount of State aid as if said roads were constructed under the provisions of this act. And provided, further, that if the appropriation so apportioned by the State shall not be so applied for a period of two years after it has become available, the amount so apportioned and set aside for that county shall be returned to the State Treasury and added to the appropriation for the current year and distributed anew under the provisions of this act. And provided, further, that nothing herein contained shall prevent any county and townships from agreeing to appropriate a larger amount for such road improvement than the amounts specified in this act, and Provided, that counties and townships may agree among themselves to contribute their combined proportion of the thirty-three and one-third per centum of the total expense of construction herein provided to be borne by them in different proportions from that hereinabove specified, but in no case shall any township or county pay less than five per centum of the entire expense of such improvements. Provided, that the county commissioners shall furnish under oath to the state highway commissioner the total number of miles of township or county public roads by townships to the state highway commissioner.

DEPARTMENT TO ENCOURAGE HIGHWAY IMPROVEMENT

Section 4. All highways improved under the provisions of this act shall conform to the standard of construction established by the state highway department as best adapted to the locality in which they may be located, with due regard to the topography and natural conditions, and the availability of road-building materials, and shall be constructed according to the best engineering practice. No section of highway improved under this act shall be less than one-fourth mile in length, nor shall the improved portion thereof be less than twelve feet in width. So far as is consistent with the just and equitable administration of this act, the state highway department shall encourage a general system of highway improvement.

Section 5. All work done under the provisions of this act shall be by contract, according to plans and specifications to be prepared by the state highway commissioner, and approved by the county commissioners of the county and the supervisors or commissioners of the township or townships as hereinbefore provided, and in awarding said contracts the work shall be given to the lowest and best bidder, with the option upon the part of the state highway commissioner, the county commissioners or the township supervisors or commissioners, to reject any or all bids if they consider the same unreasonable, or if the prices named are materially higher than the estimated cost of the work as provided for. Every person, firm, or corporation before

being awarded any contract for the construction or improvement of any highway under the provisions of this act, shall furnish a bond acceptable to the state highway commissioner in a sum equal to the contract price of the work conditioned upon the satisfactory completion of the same, and to save harmless the State, county and the township, or townships, in which the work may lie from any expense incurred through the failure of said contractor to complete the work as specified, or for any damages growing out of the carelessness of said contractor or his or its servants.

Townships May Bid for Highway Work

Section 6. Any township may, through its supervisors or commissioners, be authorized to bid for the construction of such portion of any highway improvement undertaken under the provisions of this act as may lie within its limits, and any township submitting such bid shall have the same consideration as other bidders, and, if awarded the contract, shall fulfill the same and be subject to the same regulations as are laid down for other bidders.

Section 7. Upon the completion of any highway, rebuilt or improved under the provisions of this act, the state highway commissioner shall immediately ascertain the total expense of the same and apportion the said total expense between the State, the county, and the township, or townships, in the proportion hereinbefore provided and in case the said improved highway shall extend into or through two or more townships, he shall apportion the proportion of the expense aforesaid to be borne by each township among the several townships in the same proportionate parts as the cost of the improvement within each township shall bear to the whole expense of the improvement which has been made according to the provisions of this act, and the said state highway commissioner shall certify the total expense of said improvement to the county commissioners and to the supervisors or commissioners of the township, or townships, in which the improved highway has been constructed, respectively specifying the amounts to be borne by the State, the county and the township, or each township, as provided by this act.

State's Share of Highway Expense

Section 8. The State's share of the expense of highway improvement, or maintenance, under the provisions of this act, shall be paid by the State treasurer upon the warrant of the state highway commissioner, attested by the chief clerk of the state highway department, out of any specific appropriations made by the legislature to carry out the provisions of this act, and the share of the county in which said highway improvement as herein provided has been made shall be a charge upon the funds of said county and shall be paid by the county treasurer upon the order of the county commissioners. The share of the township or townships in which the said highway improvement as herein provided has been made, shall be paid by the township supervisors or commissioners as other debts of said township, or townships, are paid. The state highway department, the county commissioners of the county, and the supervisors or commissioners of the township, or townships, in which any highway is being improved under the provisions of this act, may, with the approval of the state highway commissioner, make partial payments to the contractor, or contractors, performing the work as the same progresses, but not more than two-thirds of their proportionate shares of the contract price for the work shall be paid in advance of the full completion of the same by either the state highway department, the county and the township, or townships, so that at least one-third of the full contract price shall be withheld until the work is satisfactorily completed and accepted and the exact proportions of the cost thereof apportioned to the State, county and township, or townships. Provided, that a cash road tax be levied by each township where such road improvement is being made to meet the cost of such permanent road improvement as is provided in this act.

Section 9. Every contract authorized to be made by the state highway department under the provisions of this act shall be made in the name of the Commonwealth of Pennsylvania, and shall be signed by the state commissioner of highways and attested by the chief clerk of the department, and shall be approved as to form and legality by the attorney-general, or deputy attorney-general, of the Commonwealth. No contract for any highway improvement shall be let by the state highway department, nor shall any work be authorized under the provisions of this act, until the written agreement of the county commissioners of the county and the supervisors or commissioners of the township, or townships, in which said proposed improvement is to be made, agreeing to assume their respective shares of the cost thereof as hereinbefore provided shall be on file in the office of the state highway department, and shall have been approved as to form and legality by the attorney general or the deputy attorney general of the commonwealth.

Section 10. The county commissioners of any county may, upon the presentation to them of a petition from the supervisors or commissioners of any township, or of two or more adjoining townships, representing that any principal highway or section thereof lying within said township, or townships, is in need of reconstruction and setting forth that said township, or townships, desire to take advantage of the provisions of this act to improve said highway, pass a resolution petitioning the state highway department to undertake the improvement of the highway or section thereof specified in the petition from the township, or townships, aforesaid and authorizing the assumption by the county of its share of the expense of said improvement accompanying the said petition to the state highway department, with a map or plan showing the layout lines, profile and grade of such highway as hereinbefore provided. Provided, that where the county commissioners petition the state highway commissioner for the improvement of a public road or parts thereof, they shall state the kind of material to be used or available for such road.

Townships May Bond for Road Construction

Section 11. The supervisors or commissioners of any township in any county of the Commonwealth may petition the county commissioners of said county to make application to the state highway department for the co-operation of the state in the reconstruction or permanent improvement of any principal highway within the said township, or any section thereof, which is much used as a thoroughfare by the people of said township and the neighboring townships, cities and boroughs agreeing by resolution to assume for said township the proportionate share of the expense of said improvement as hereinbefore provided. It shall be lawful for any township to incur indebtedness or to issue bonds in the manner authorized by law for the payment of the said township's share of the cost of any highway improvement undertaken under the provisions of this act. If, within thirty days after the receipt of any petition for highway improvement in any township under the provisions of this act, a petition signed by the owners of a majority of the assessed valuation of real estate in said township is received by the county commissioners of the county in which said township is located protesting against said proposed expenditure upon the part of the township, then the county commissioners shall take no action on said petition for improvement but shall return the same to the supervisors or commissioners from whom it was received. Upon the receipt of a petition signed by the owners of a majority of the assessed valuation of real estate in any township requesting the application by said township for the improvement of any highway in said township according to the provisions of this act, it shall be the duty of the supervisors or commissioners of said township to petition the county commissioners in the manner hereinbefore described.

Section 12. In case the county commissioners of any county shall neglect or refuse to act upon the petition of any township, or townships, for highway improvement as herein provided, or shall refuse to petition the state highway department for state aid in such proposed improvement after said township, or townships, shall have complied with the conditions of this act in petitioning said county commissioners, the supervisors or commissioners of said township, or townships, may, through their proper officers, petition the court of quarter sessions of said county for the appointment of a jury of view to examine into the necessity of said proposed highway improvement and, upon the said jury of view making a report favorable to said improvement and with the approval of the court, it shall be the duty of, and the court may by order require, the said county commissioners to petition the said state highway department for the co-operation of the state in the said proposed highway improvement in the manner herein provided. Said jury of view to be appointed and compensated in the same manner and to have the same powers

as juries of view for laying out or changing public roads have by existing laws.

Section 13. The supervisors or commissioners of any adjacent townships, in the same county in which any portion of a principal highway running into or through said townships may lie, may by resolution jointly petition the county commissioners of their county to make application to the state highway department for the co-operation of the state in repairing or rebuilding said highway as herein provided.

Section 14. Advertisements for proposals for the reconstruction or improvement of highways under the provisions of this act shall be given by the county commissioners at least thirty days before the contracts may be awarded by public notice in at least two newspapers of general circulation in the county in which the highway to be improved is located, such advertisement to designate where the plans and specifications may be had and the time and place of the reception of bids and the letting of the contract.

TEN PER CENT. OF ROAD FUND FOR MAINTENANCE

Section 15. Ten per centum of the amount available for highway purposes under the provisions of this act shall be set aside for the purpose of maintenance of highways as hereinafter provided and shall be apportioned by the state highway commissioner among the townships, or counties, applying for the same in proportion to the mileage of improved highways made under the provisions of this act, or which have already been made or may hereafter be made at the expense of such townships, or counties, and which are of the standard prescribed by the state highway department for improved highways.

Section 16. Whenever the supervisors or commissioners of any township, or county, shall desire State aid for the purpose of maintenance of improved highways, whether State highways improved under the provisions of this act or otherwise, it shall be the duty of said supervisors or commissioners to file with the state highway department, on or before the first day of April in each year, a sworn petition requesting such State aid and setting forth the number of miles of highways improved according to the standards of the state highway department in said township and the cost of the same to said township, together with the condition of said improved highways and the average annual cost of maintaining the same. The state commissioner of highways, if in his judgment the conditions warrant the co-operation of the state in maintaining said highways, shall apportion to said township its proportion of the total amount available for the maintenance of improved highways as hereinbefore provided, and the said amount shall be paid to the supervisors or commissioners of said township by warrant of the state highway department, but in no case shall the amount thus given by the state for maintenance be more than one-half the amount which, in the judgment and experience of the state highway commissioners, the annual cost of maintaining improved highways of the standard of construction prevailing in such township should be, nor more than one-half the sworn average annual cost of maintenance as set forth in the petition of the supervisors or commissioners of the said townships.

Section 17. All highways or portions of highways constructed or improved under the provisions of this act shall thereafter be known as "state highways," but so far as the same may be within the limits of any township shall be kept in repair, so that they may be maintained at the standard of condition prescribed for highways of their class by the state highway department at the expense of said township, but the supervisors or commissioners of any township possessing improved highways may ask for and receive state aid for the maintenance of the same as hereinbefore provided. It shall be the duty of the supervisors or commissioners of every township, in which said state highways may lie, to maintain the same generally at a reasonable standard prescribed for such roads by the state highway department.

Section 18. The word "highway," as used in this act, shall be construed to include any existing causeway or bridge, or any new causeway or bridge, or any drain or water course, which may form a part of a road and which might properly be built according to existing laws by the township or townships, but shall not include causeways or bridges which should properly be built by a county or adjoining counties, or by the state.

COUNTIES MAY AID TOWNS

Section 19. Where a portion of an important main highway traversing one or more townships, and for the improvement of which according to the provisions of this act application has been made by said township or townships, shall lie within the limits of any borough or boroughs, and where the failure of said borough, or boroughs, to improve the said highway would leave a break or unimproved section in a continuous improved highway, it shall be lawful for the county commissioners of the county in which said highway is located to enter into an agreement with said borough, or boroughs, to bear a portion of the expense of said improvement of the highway within the borough limits in the same manner as is herein provided for co-operation between the counties and townships, and the state highway department may, if the state highway commissioner so recommends, bear a portion of the expense of said improvement of said highway within said borough limits, but in no case shall the portion of said expense to be borne by the state exceed one-third of the total expense of said improvement, and boroughs shall only receive aid from the state as aforesaid in cases where failure to receive such aid would prevent a continuous improvement of an important main highway, provision for the rebuilding of which has been made in the township, or townships, adjoining said borough, or boroughs. All improvements made in borough highways as herein provided shall be of a character similar to that specified for the township, or townships, through which the highway to be improved passes in reaching said borough and boroughs, and the plans and specifications for the work shall be approved by the state highway department and the completed work shall be approved by said department before any warrant shall be issued for the state's share in such improvement as herein provided. It shall be the duty of the proper officers of said borough, or boroughs, charged with the maintenance of the streets and highways of said borough or boroughs, to keep and maintain said improved highway within the borough limits in a condition to conform to the standard established by the state highway department for the maintenance of similar highways.

STATE NOT LIABLE FOR DAMAGES FROM ROAD CONSTRUCTION

Section 20. The Commonwealth of Pennsylvania shall not be liable to any person or corporation for damages arising from the rebuilding or improvement of any highway under this act, nor shall the state engage to keep such highway in repair after the same shall have been rebuilt or improved, except to extend the aid in maintenance herein provided. In case any person or persons or corporations shall sustain damage by any change in grade, or by the taking of land to alter the location of any highway which may be improved under this act, and the county commissioner and the parties so injured cannot agree on the amount of damages sustained, such persons or corporations may present their petition to the court of quarter sessions for the appointment of viewers to ascertain and assess such damage. The proceedings upon which said petition and the viewers shall be governed shall be the laws relating to the assessment of damages for opening public highways and such damages when ascertained shall be paid by the respective counties and afterwards apportioned by the commissioner of highways according to the provisions of section seven.

Section 21. In addition to his other duties, the state highway commissioner shall cause to be made and kept for the state highway department a general highway plan of the State and compile statistics and correct information relative to the mileage, character and condition of the highways in the townships and counties of the state. He shall investigate and determine upon the various methods of road construction best adapted to the various sections of the state and establish standards for the construction and maintenance of highways in the various sections, taking into consideration the topography of the country, the natural conditions, and the character and availability of road-building material and the ability of the townships and counties to build and maintain roads under the provisions of this act. He may at all reasonable times be consulted by county, city, borough, or township officers having authority over highways and bridges, and shall when requested advise and give

information to such officers relative to the construction, repairing, alteration, and maintenance of the said highways and bridges. He shall at all times lend his aid in promoting improvement throughout the state and shall prepare and disseminate useful information relative to road building and improvement.

Section 22. County commissioners or county engineers of the several counties of this state, and the officers of all cities, boroughs, and townships in the state who now have or may hereafter have, by law, authority over the public highways and bridges shall, upon the written request of the state highway department, furnish said department with any information relative to the mileage cost of building and maintenance, condition and character, of the highways under their jurisdiction and with any other needful information relating to the said highways.

MUST BUILD PERMANENT ROADS

Section 23. All highways improved under the provisions of this act shall require the construction of a macadamized road, or a telford or other stone road, or a road constructed of gravel, cinder, oyster shells, or other good materials, in such manner that the same of whatever material constructed will, with reasonable repairs thereto, at all seasons of the year be firm, smooth and convenient for travel. The county commissioners shall have the authority to select the kind of materials to be used in improving any road under the provisions of this act. Any difference of opinion that may arise between the county commissioners and the township road authorities as to the kind of a road to be built shall be decided by the state highway commissioner. The state highway commissioner shall furnish to the county commissioners and township road authorities information as to the probable cost of improved highways as defined in this section.

Section 24. The sum of six millions, five hundred thousand dollars is hereby appropriated to carry out the provisions of this act during the next six years. Of this sum an amount not to exceed five hundred thousand dollars shall be available in the first year after the passage of this act; not more than five hundred thousand dollars shall be available in the second year; one million, two hundred and fifty thousand dollars in each of the two next following years; and one million, five hundred thousand dollars in each of the two years next following.

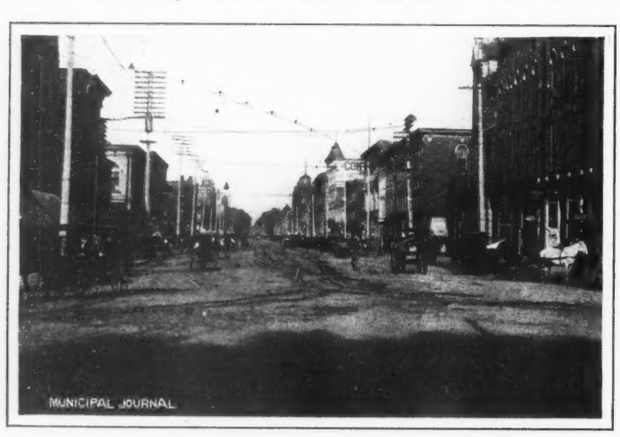
Section 25. All acts or parts of acts inconsistent herewith are hereby repealed. Provided, that the provisions of this act shall not be construed to repeal any of the provisions of the road acts approved June twenty-sixth, one thousand eight hundred and ninety-five, pamphlet laws three hundred and thirty-six, and June twenty-three, one thousand eight hundred and ninety-seven, pamphlet laws one hundred and ninety-four, and July ten, one thousand nine hundred and one, pamphlet laws six hundred and thirty-six.

PAVING BRICK

Pertinent Suggestion by the Manufacturer—Bad Brick Pavements Due to Faulty Construction—Brick Pavement Strong Competitor of Asphalt

By D. V. Purington *

It has been a long time since I attempted to put on paper any ideas of my own in regard to brick. Indeed, it has sometimes seemed that the older I grew and the more experience I had the less sure I felt of any part of the brick business. In other words, so many things I was absolutely sure of years ago are now more or less surrounded with doubt. There are, however, a few axioms which can be utilized to lay a foundation for a short paper relating to an industry that has occupied the best thought and labor of an audience such as this. To you it will not be necessary to emphasize or call attention to the difference between the two terms, "Paving Brick" and "Brick Paving." The former concerns us directly and the latter indirectly. We can control the first and can suffer in silence if the material we make is first-class and is put into a pavement in such a manner as to make it almost worthless. It should be the duty of everyone engaged in manufacturing to produce the best possible article. In no branch of business is this more absolutely necessary than in that of manufacturing material for street paving. It is generally conceded that there is a good market, especially in the West, for a first-class paving brick, and that if the standard of quality is kept up to the highest possible point there is no question that the demand will continue. That this standard has always been the goal aimed for is susceptible of doubt, and it is because so many so-called paving brick have been laid on streets and their unfitness clearly demonstrated that so many of us have found it difficult to overcome objections.



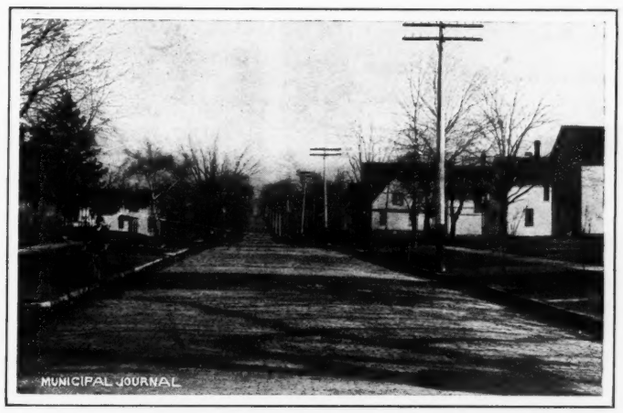
GALESBURG BUSINESS STREET, PAVED WITH PURINGTON BLOCK

Many of this class have been made and sold by some of the largest as well as the smallest manufacturers, and the loss has fallen upon all. That this situation was clearly understood is evidenced by the fact that the general average of quality of paving brick furnished in 1902 was far above that of any previous year. When it is remembered that this industry is less than 20 years old and that its development has necessarily been slow, it is remarkable that so much progress has been made. The men who have been influential in this development had for the most part been engaged in one or other of the different branches of brickmaking prior to the discovery that brick could be made of shale. Very much of their previous education was rendered useless, or worse than useless, when applied to paving brick, for the reason that many of the processes required to make a good paving brick were scarcely known twenty years ago. This was particularly true of the manner and methods of burning. The requirements of a good paver necessitated much more care and the knowledge of what these requirements were had to be learned by observation and experience. Like electricity, which came into practical use about the same time, the results were astonishing and were frequently produced without the producer being able to tell just how it was done.

It is not my intention to give this paper a personal bias, but it is almost impossible for one who has given the best years of his life to it, to refrain entirely from deductions drawn from his personal experience. It is not so easy as may be supposed to describe accurately a good first grade paving brick. In a general way it may be said to be one which when used on the street will fulfill all possible re-

* Mr. D. V. Purington is the President of the Purington Paving Brick Company, of Galesburg, Ill., and he recently read this paper before the Wisconsin Clay Workers' Association at Green Bay, Wis. Mr. Purington has had many years of valuable experience in the manufacture of paving brick and is looked upon as one of the leaders in that industry.—[EDITOR.

quirements. It must be fairly smooth and tough. It has been claimed that its quality can be foretold by the eye of one experienced in handling such material, and this supposition is in general correct, but the manufacturer too late discovers that appearances are



BRICK PAVED RESIDENCE STREET—GALESBURG, ILL.

sometimes deceitful. It is my judgment that a mechanical test only will decide definitely and surely the wearing and durable qualities of a paving brick.

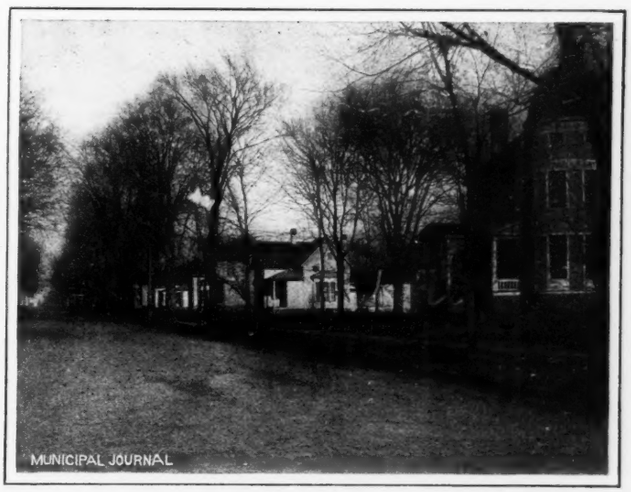
The efforts of the National Brick Manufacturers' Association, directed by Professor Orton of the Ohio State University, have culminated in putting within our reach the means of determining with more than reasonable accuracy a paving brick that will comply with the most stringent specifications. It is not half so important that these tests should be applied by the purchaser as by the seller. All the buyer or municipal corporation have to do with material that fails to meet the required tests is to reject it, and it is then up to the seller to remove it from the street. In shipping brick for paving purposes one should never lose sight of the fact that it costs just as much to pay freight and cartage on a poor as on a good article, and should unfit material be placed in the street the maker is the party who suffers most.

portion of time used in developing the art of making paving brick,

In looking back over the past twelve years, which cover the greater it is certainly encouraging to note the great advances made in the methods of manufacture and the great improvement in the conducting of the business as a whole. The class of men who are engaged in it are keenly alive to existing conditions—one of the most discouraging of which is the lack of unity of purpose manifested by the different men and firms engaged in the making of paving brick as an avocation.

It may be a little out of order but naturally a point has been touched upon that may justify a little enlargement before such an audience as this.

The principal competitor of paving brick is asphalt. This material has advantages that must be admitted, even though such advantages are small and few in number. One of the principal of these is that all the raw material used by the asphalt companies is owned or controlled by one corporation. That no matter what the expense of promotion may be the cost is distributed over the entire field, and the parent company reaps the full reward by adding to the price of the asphalt. It can send its promoters to a town or city, subsidize newspapers, influence councilmen, secure signatures for work on streets and know absolutely that all the expense will come back in the shape of increased price for its raw material. I have never yet known any concert of action among the brick manufacturers toward that kind of systematic promotion. As a rule, the man who promotes brick paving sees his competitor furnish the brick, and this may explain to many of you why all the activity in promotion is at present confined to the material imported from the land of the cheapest of cheap labor. No criticism is here intended on the system of getting work started. The man who has decided that he will purchase an automobile naturally depends upon the eloquence and smoothness of the sellers of these vehicles in his efforts to find out which is the best suited to his purpose. And the property owner who has lived for years on an unpaved street unites with his neighbors in a determination to have their street improved and the material which is backed up by an organization skilled in conveying information or misinformation, as the case may be, and which has its emissaries in readiness to catch on quickly and talk glibly, is fairly sure to capture the prize. Indeed, it is the business of a street promoter to call the attention of the property owner to the fact that he is behind the times in living on an unpaved street and to make him see that his property would be improved in value far beyond the cost of paving. The question is often asked: Why are the brick men so dilatory in doing the preliminary work? It is to answer this question that has caused a digression from the subject of this paper. It is simply a revised version of the old story of the bundle of sticks. The pitch asphalt of this country is controlled absolutely by one corporation, while the brick manufactured for paving purposes is controlled by an owner whose name is "Legion." The remark so long ago made by the old man to his sons that "in union there is strength" was not more pertinent as an illustration than when applied to the paving interests represented by Asphalt and Brick. Inasmuch as more paving brick were laid in 1902 than in any previous year, and those of better quality, the manufacturers need not feel discouraged. Year by year as the durability of the pavement is manifested the competition between it and that of any inferior material will lessen. The one advice I have to give to all engaged in making paving brick,



ANOTHER BRICK PAVED STREET IN GALESBURG

is to strive earnestly and intelligently to make a better and more durable article. Never mind what your competitors say—or the engineers, city and town authorities. Be sure yourselves that you will be able in the years to come to refute all criticism by the actual service and wear your material has been capable of, and you will receive the reward always given to the faithful. Neglect this guarantee and you will deserve the punishment which will surely follow.

WORK ON THE GREAT CROTON DAM

Thorough and Painstaking Work of the Present Aqueduct Commission—Ready for Use by Fall—Other Plans Under Way to Increase Supply

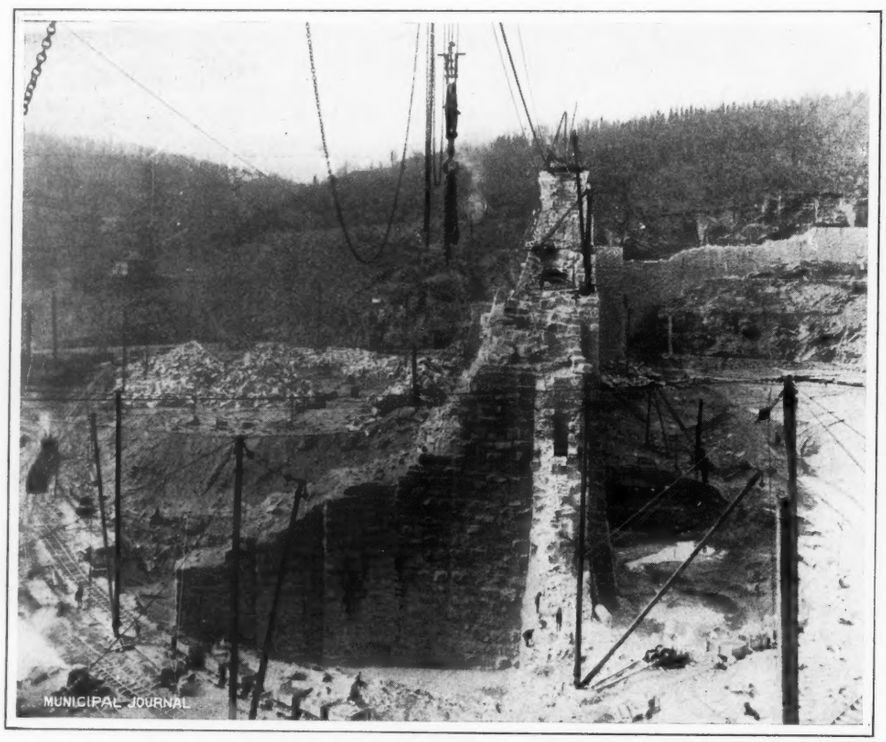
By Arthur H. Battey

For more than twelve years the city of New York has been carrying out plans for the enlargement of its water supply, the most important factor in which is the construction of the great Croton Dam. When completed this dam will be second only to the Wachuset Dam, now building by the Metropolitan Board of Water and Sewer Commissioners of Massachusetts, which will have a capacity of 63,000,000,000 gallons, nearly double that of the Croton Dam. The Croton Dam is located in the Croton Valley, two and one-quarter miles below the old dam. The original plans called for a structure having a total height of two hundred and twenty-nine feet, of which one hundred and fifty-nine feet would be above ground and seventy feet below the surface, and it would form a body of water twenty-one square miles in extent, varying in depth from one hundred and fifty-nine feet upward.

When the Work Commenced

It is interesting to know as a matter of history that the contracts authorizing the construction of this dam were signed August 31, 1891, and ground was first broken on September 20, 1892. The first estimate placed the total cost of the dam at $3,650,000, and the time required for its completion, five years. That these estimates were really no more than rough guesses is demonstrated by the fact that it has been building for more than eleven years, and the expense to date has far exceeded that amount. It was predicted at the time that the new dam would be altogether too large for the probable needs of the city, even though liberal allowance was made for the rapidly increasing population and consequent demands upon the system; these predictions have not only proven false, but the likelihood is that by the time dam is completed, the city will require an amount of water equal to its fullest capacity. In fact, the city, at present, is casting longing eyes toward the Adirondack lakes, considering the advisability of filtering the Hudson River water at a point above Poughkeepsie, or tapping Lake George, the Housatonic region in Connecticut, the Hackensack watershed in New Jersey, or the Ramapo water district, which became so notorious a year or so ago. The authorities move with a snail's pace, as compared with the work of our New England cousins; the work of providing the immense supply of water for the Metropolitan District of Massachusetts has been under way only about half as long as the Croton Dam, and yet it is nearer completion than is the Croton Dam. Besides this, when completed it will provide a supply of water adequate to any demand which may be made upon it for a period of the next fifty years, allowing for even an abnormal increase in the population of that section. New York is so ponderous in its movements that it is quite probable that the demand will exceed the supply for some years to come, and the danger—unless meters are placed on all taps throughout the city—of a restricted use of water, if not a famine, is by no means imaginary.

There are some reasons why, however, the construction work of the Croton Dam exceeds in difficulty and necessary slowness those surrounding the Wachuset Dam. For instance, while one village had to be bodily moved out of the bed of the proposed Wachuset Dam, four villages had to be removed in connection with the construction work upon the Croton Dam, and before the construction of the great wall commenced it was necessary to remove the subsoil covering an area of many square miles to prevent future contamination of the impounded water. "Croton City," as it might be called, was made up of engineers, teamsters, laborers, cooks, laundry men, tradesmen, etc., and was as large in population as some enterprising small cities of the West. From the time the work commenced until the present, the scene of action has been made most thoroughly alive by the hundreds of employees, scores of teams, puffing engines, temporary railways, dozens of immense cranes lifting huge stones into place, and other agents, all performing their functions deftly and thoroughly.



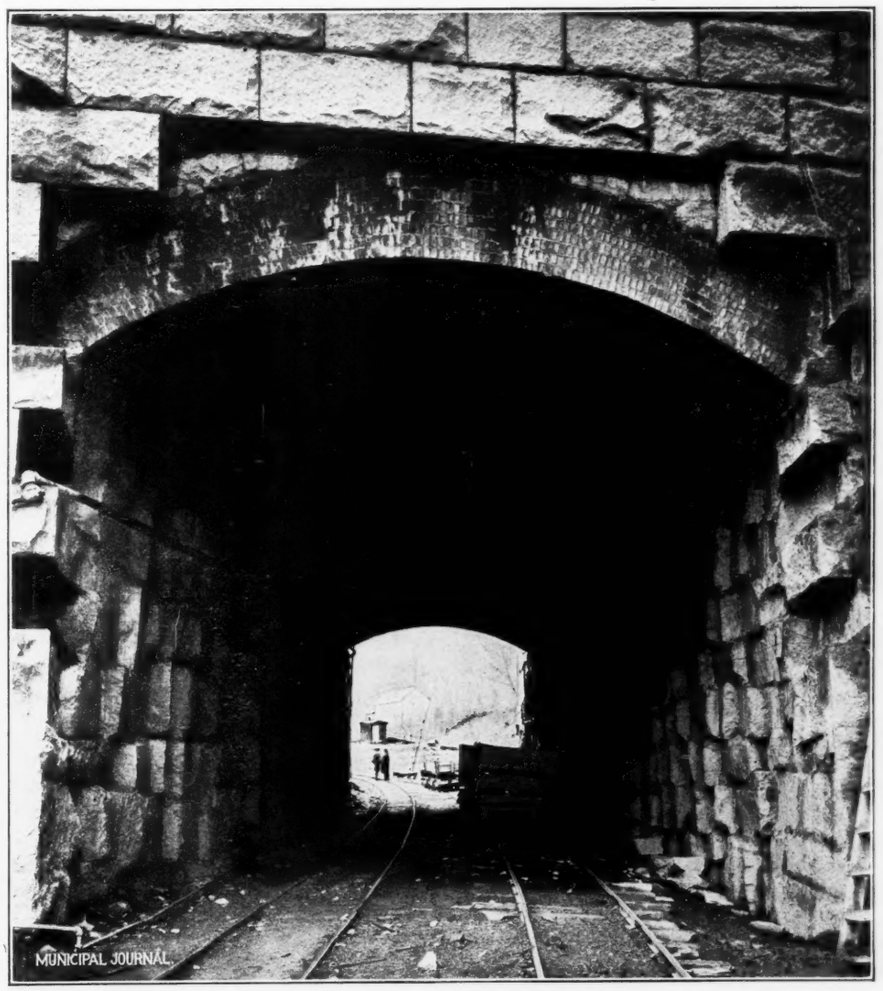
THE CORE WALL, LOOKING NORTH, WITH ITS CRUMBLING BASE

How the Work Has Dragged Along

Greatly to the disadvantage of the city, municipal governments have come and gone, and the work has dragged along in the usual Tammany fashion until quite recently, when the new commissioners took hold under the leadership of President William H. Ten Eyck. When the new chief engineer, Mr. William R. Hill, assumed engineering control, some years ago, and after he had made a most thorough examination of the situation, it was found necessary to make some changes in the original plans, which have necessarily delayed the completion of the dam. As has been demonstrated by a graphic report submitted by the chief engineer of the commission, the change was absolutely essential to the safety of the dam, and the city is to be congratulated that the mistake was discovered in time to rectify it without the outlay of a much larger sum of money.

One great item in the expense attending the construction of the new dam has been the cost of lands condemned to prevent pollution of the supply of water it was intended to impound. The city found itself in a maze of lawsuits, but the legislature came to its aid and and straightened out the tangle by making the city's needs paramount to any private interests, providing for a commission to fix damages to property owners, and under whose authority an area of 7,258 acres has been withdrawn from private ownership, of which 3,425 acres will be under water when the new dam is used to its fullest capacity. In order to do this the villages of Katonah, Purdy's Station, Pine's Bridge, and Huntersville have been wiped out completely, and their sites in time will be covered by rippling waves. With them go farmlands and homesteads, graveyards have been disturbed and the bones of the dead transported to other resting places where there is no danger of their polluting the water, and a large section of the northern part of Westchester County has undergone a transformation which leaves nothing but memory to tell what it once was. The fact that the new dam will hold sufficient water to cover the old one, two and a quarter miles away, to a depth of forty feet, will show to what an extent the face of nature will be changed.

One of the landmarks to be obliterated is the Palmer House, near the old dam, which has for more than a generation been a meeting place and general hatchery of schemes for the politicians who have made the county their stamping ground.



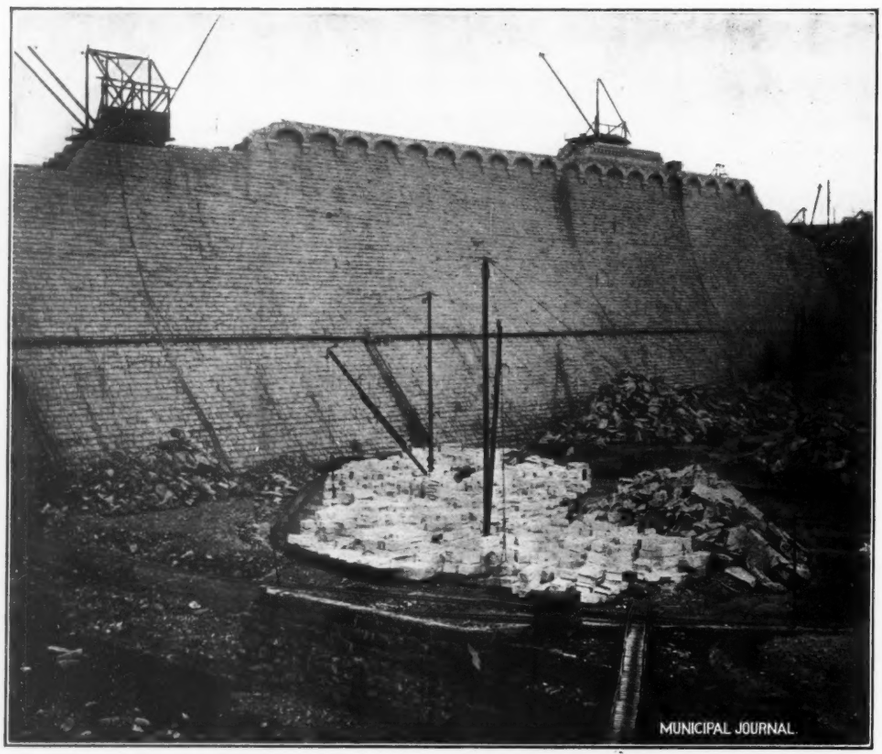
ARCHWAY LEFT FOR WORKING NEEDS—SHOWING THICKNESS AT THE BASE—NEARLY TWICE AS THICK AT BASE, 186 FEET BELOW

THE HUGE DIMENSIONS OF THE DAM

The new dam, which is the largest structure of the sort in this country, is so massive that its real dimensions do not strike the beholder at the first glance. That the main wall and the spillway form a barrier nearly half a mile long between two hillsides, is a thing to say, but when it is remembered that down beneath the graceful curving slope exposed to view is a structure two hundred feet wide at the base and seventy feet high; that there will be 750,000 cubic yards of masonry in the wall when it is completed; that it will, of itself, impound 32,000,0000,000 gallons of water, and that this vast body of water is only part of the Croton system, which will store up an aggregate of 75,250,000,000 gallons; that this means a lake of water reaching back fourteen miles in a straight line, from the dam to close to the Putnam County border, and nearly twenty miles when the river's course is followed; that this supply of water will keep New York City, or rather that part of it included in the Boroughs of Manhattan and the Bronx, from being thirsty for a year and a half, even if no rain should fall, there are figures involved which the mind cannot comprehend. The stone alone would make a wall nine feet high and two yards thick, more than three times around the shore line of Manhattan Island, or form a wall a yard thick and two yards high more than 213 miles in length, or from New York City beyond Baltimore on the south, to Saratoga on the north, or nearly to Boston on the east.

The Aqueduct Commissioners say that the new dam will be so nearly finished by December next that water will be let in behind it, but the area to be filled is so large that the structure will be entirely finished long before the water flowing over the spillway of the old dam reaches anywhere near the top courses of the new one. When it is 150 feet deep it will begin its flow over the new spillway, but before that time comes the New York Central Railway will have new tracks laid outside the limits of the big pond, thousands of acres will be cleared of woodland and brush, bridges built, roads laid out, and the dam at Muscoot Mountain completed. The reserviors of the Croton system, which will all be subsidiary to this big one, include the Amawalk, with a capacity of 7,000,000,000 gallons; the Sodom and Bog Brook, 9,028,000,000 gallons; Carmel, 9,000,000,000; Titicus, 7,200,000,000; Jerome Park, 1,500,000,000, and the old system, as it is called, which includes all the other sources of supply for Manhattan, and impounds about 9,000,000,000 gallons.

That unforeseen delays have aided in lengthening out the time required for building the dam is admitted, but strikes, bad weather, and all other incidents attending a work of size do not afford a reasonable excuse for the time which has been spent on the Croton Dam. Instances might be multiplied of works of as much importance which have been put through with business-like promptness, but as a sharp contrast it is well to recall the great Nile dam, at Assouan. It is a mile and a quarter long, 100 feet thick and 130 feet high. It has 180 sluice gates, used up 75,000 tons of Portland cement and 200 tons of explosives in construction, called for nearly 90,000 square feet of flooring to be laid, taken up and relaid each year, and about twenty-two miles of railroad to be built, the greater part of which was taken up and relaid three times owing to the Nile floods. It impounds 280,000,000,000 gallons of water, nearly nine times as much as the Croton Dam is directly responsible for, yet the contract for this work was signed in February, 1898, work was begun in April following, and the dam was completed and put to



LATEST VIEW OF THE FRONT OF CROTON DAM

full use in December, 1902, or four years and eight months after the work commenced.

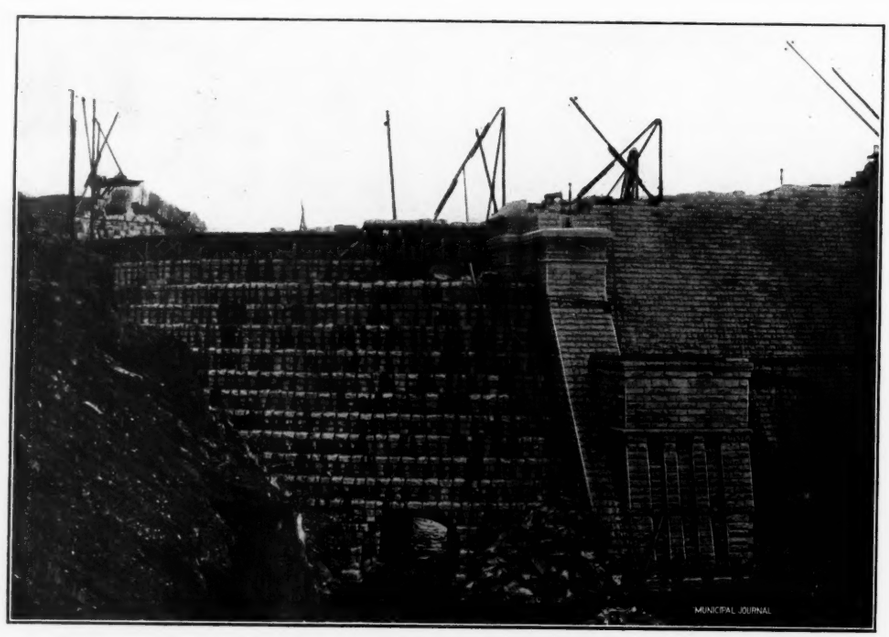
RAPIDLY APPROACHING COMPLETION

But the big city is awakening. Delays have taught it the lesson that it is the part of wisdom to be prepared, and a commission composed of William H Burr, Rudolph Hering and John R. Freeman is to report in the coming fall on the possibility of obtaining an additional daily supply of 150,000,000 gallons. Then will come the construction of another storage system, with a daily capacity of from 500,000,000 to 1,000,000,000 gallons, and as the whole city now calls for about 400,000,000 gallons daily the larger plant will be all too small in another half century. The watershed chosen will be entirely within the State, so as to avoid the delay incident to a dispute over interstate water rights, and among the sites inspected is the valley of the Wallkill, with an estimated daily yield of 315,000,000 gallons. At New Hampton, in Orange County, sixty-four miles from New York, a dam could be built, the engineers say, which would convert the valley into a reservoir twenty-five feet deep, covering fifty square miles. North of the Croton valley, in Putnam and Dutchess counties, is another watershed believed to be capable of daily supplying 150,000,000 gallons.

All these plans, however, are in the air. The big dam remains at present an object of much solicitude to the people of New York, and an object lesson in the art of not getting work done according to contract or when it should be finished. And while there is material enough in the big wall to furnish granite for all of Manhattan's sky scrapers and leave enough over to build towers for all the bridges planned, together with a large section of the subway, the cutting and placing of it, and the cost attending the work, have been out of all proportion to the time and money required for similar work elsewhere.

One other delay will now be caused by the discovery that the core wall of the former earthen portion of the dam built on sandstone that is soft and disintegrated. In March of this year Chief Engineer Hill of the Aqueduct Commission, called attention to the fact that the foundation under the core wall, as disclosed by the removal of a portion of it, was in very bad condition. Expert geologists investigated the matter and reported that the sandstone was so soft that it "runs with water like sand" and that it was uncertain how far down the disintegration had penetrated, depending largely upon geological conditions in the past. Investigations showed that forty-five feet down no improvement was evident in the character of the rock. Careful examinations will be made all along the line of the dam to ascertain how far the poor sandstone extends and to determine whether the masonry portion of the dam has been built over such rock. Until a report is received from the geologists on this point, nothing can be done. A serious engineering problem would be presented should it be found that the masonry dam was not laid on hard stone, and it is probable that that an outer dam would be erected to strengthen the present one. Whatever is done, however, much time and a large amount of money must be spent to rectify the apparently serious errors made by the engineers who first planned the work.

The replacing of the earthen portion of the first dam with solid masonry will form a continuity of structure across the valley, but it is a question whether the rebuilding of this portion was necessary as regarded from a point of view of strength. The present engineer considered it was necessary. Other engineers of experience have differed with him on this point, but all will agree on the better appearance of a uniform masonry wall.



SHOWING THE SPILLWAY

CEMENT WALKS IN HAMILTON

How They Are Laid—Specifications for the Cement—Experience Shows Enduring Qualities

A description of the cement walks and the method by which they are laid in the city of Hamilton, Ont., was secured by a representative of THE MUNICIPAL JOURNAL and will be of interest to all city officials. These walks have been laid in all directions throughout the city and during 1902, thirty-four miles of walk were added to the already large amount in place.

The method of laying the walks is different from that pursued in many other cities in that the walk is started at the curb line and carried in toward the property line. On streets where there are no

SHOWING HOW CORNER IS TURNED

substantial curbs, the walk is continued down to the street level and below, excavation being made for a proper foundation for the same. The way this is done may be seen from the accompanying illustration. At the street corners has been placed a solid circle to take the place of the old style three-piece corners.

Regarding the kind of cement used by the engineering department of the city in laying these walks the report of Assistant City Engineer Heddle states: "The Cayuga Lake Cement Company of Ithaca, N. Y., supplied the cement during the year, and it proved very satisfactory, coming up to the requirements of the specifications in every particular." The specifications under which the cement is supplied are as follows:

Color—The cement to be of uniform color; any cement showing yellowish blotches after being made into thin cakes is to be rejected.

Weight—The specific gravity shall not be less than 3.09, nor greater than 3.25.

Tensile Strength—The average results per square inch must be: neat cement, 3 days, 300 pounds; 7 days, 450 pounds; 28 days, 600 pounds.

Fineness—All cement shall be ground of such fineness that at least 92 per cent. shall pass through a sieve having 10,000 holes to the square inch.

Soundness—Thin cakes, after setting, are to be subjected to moist heat of 170 degrees Fr. for twenty-four hours and not to show any signs of contraction or cracking.

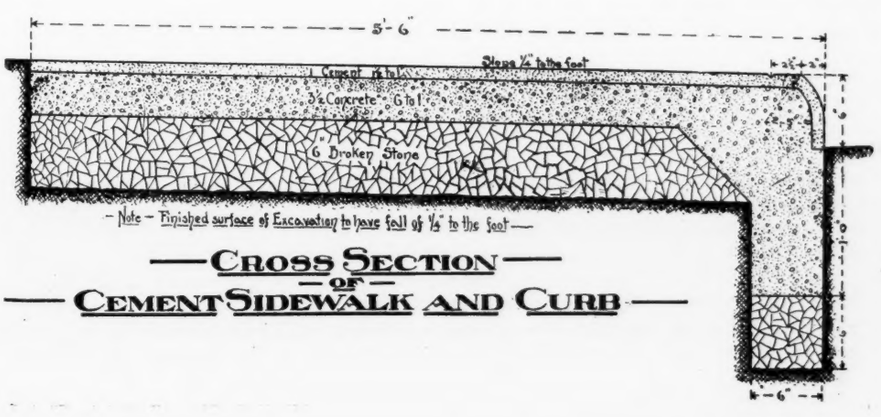
Setting—The cement shall not acquire its initial set in less than forty-five minutes, and must have acquired its final set in ten hours.

The total number of miles of cement walk with curb amounts to 28.3 and the amount without curb to 46.97, giving a total of 75.27 miles in length, with an area of 1,193,002 square feet. The amount expended on this work aggregated $153,082, or an average of 12.83 cents per square foot. In this cost is included the moving and replacing of culverts or drains, both public and private, the laying of special driveways for property owners and the removal and replacing of all poles in the line of the walks. For the three years preceding 1900 only 17.47 miles of walk were laid, but since then the work has been carried on with great activity, 23.7 miles being laid in 1901 and 34.1 in 1902. At the present time the percentage of cement walks is 65 of the whole, and in a few years, at the rate they are being laid, there will be no wooden walks in the city.

The method of construction requires the excavation of at least nine inches of the soil to enable a good foundation to be laid. This is tamped with iron tampers, all soft or sandy places are filled and a layer of broken stone well tamped to a thickness of five inches. On this is placed the concrete mixture, three and one-half inches in thickness. This is mixed in a proportion of six to one and on this is placed, before setting, the top course of one-inch in thickness and of one and one-half to one in proportion. This is blocked off and scored. The slope is one-fourth inch toward the street.

SHOWING SIDEWALKS USED AS CURB

The excavation for the curb is made two feet in depth, the bottom being nine inches wide and parallel with the pavement. The outer edge of the cut is at right angles to the pavement, but the inner edge tapers so as to make the width of the excavation six and three-fourths inches at the top. Six inches of broken stone is placed in this cut and is wet and tamped. On this is placed a layer of twelve inches of concrete composed of one part of cement, two parts of sand and four parts crushed stone. Above the line of the roadway the mixture is made one part cement, two parts of sand and three parts broken stone. This is coated on the top and street side with the top course used on the walk. Experience has shown that this curb has a long life. It does not chip when driven over or struck by the wheels of wagons.



CROSS SECTION OF CEMENT SIDEWALK AND CURB

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NEW YORK, JUNE, 1903

The Two Hundred and Fiftieth Birth Year of New York

On the 2d of February, 1653, the city of New Amsterdam received its first charter, granting the privileges of city government, from Governor Peter Stuyvesant, of the Province of New Netherlands. Later it was captured by the English and re-christened New York; but the city's civic life began on the day mentioned. The celebration of this interesting event was deferred until the latter part of last month, when for a whole week, by proclamation of His Honor, Mayor Seth Low, the five boroughs of Greater New York put on gala day attire, held public meetings and special exercises in all the schools, special sermons were given in the churches, and in other ways efforts were made to impress the importance of this occasion upon the public mind.

The development of the metropolis of the New World has excited the wonder of the nations. Beginning with a population of 1,120, it has grown from its insignificance to occupy the second place of municipal importance in the whole world.

The contrast between the cities of New Amsterdam, 1653, and New York, 1903, is exceedingly interesting.

New Amsterdam occupied but a few acres on the lower part of Manhattan Island, and the value of its realty was hardly worth mentioning. The entire island, having 13,487 acres, was purchased from the Indians by the Dutch, the price being the equivalent of twenty-four dollars in bright colored beads, brilliant bandana handkerchiefs, utensils of shiny tinware, a few hatchets and some small looking glasses. To-day a single inch of the soil of Manhattan is worth more than was paid for the 13,487 acres. General James Grant Wilson computed that if the purchase price of the island—twenty-four dollars—had been placed at compound interest, at the rate of seven per cent., it would have amounted in May, 1903, to $4,539,240,000, much more than the assessed value of the real estate of Manhattan Island for 1903, which is $3,490,679,832.

The city of New Amsterdam, of course, began with nothing in the way of municipal improvements. For the first year or so of its existence it even had no regular revenue, but had to depend upon the whim of the Governor for support, or go without. The first street was paved in 1657, it being known now as Stone Street. The street was paved on the petition of the owners, who agreed to pay the cost, the work being done by two overseers appointed by the city. Its growth during the first one hundred and fifty years was not so marked, and its real financial life did not begin until 1830, since which date continuous and reliable records have been kept. In 1830, New York had a population of 197,112 and the regular budget for that year amounted to $676,618.

The actual income of the city for 1902, from all sources, amounted to about $120,000,000 and the expenditures for maintenance and operation aggregated about $104,000,000. New York has a population to-day of 3,600,000 and an area of three hundred and eight square miles.

The assets of the city show another interesting point of contrast. Its city hall, including the ground on which it stands, public buildings, apparatus, etc., are valued at $8,103,000; its police department, at $4,686,850; its fire department, at $14,577,800; its public schools, at $59,323,486; its libraries, at $4,281,000; its art galleries, museums, etc., at $24,633,000; its parks, at $306,472,890; its jails, at $6,018,500; its workhouses, reformatories, etc., at $3,868,900; its hospitals, at $9,888,000; its asylums, almshouses, etc., at $4,360,025; its docks and wharves, at $64,531,688; its ferries and bridges, at $45,248,821; its markets, at $8,556,900; its cemeteries, at $38,100—the principal cemeteries are not owned by the city—its bath houses, bathing pools and beaches, at $387,985; its waterworks, at $123,012,020, and other assets aggregating $27,890,218, making a grand total of $908,490,531. This represents a development almost incomprehensible. Indeed, the human mind cannot grasp the meaning of the cash value of New York's assets.

But this has not been the only kind of progress. In the beginning its citizens were the subjects of a despotic government, who had few privileges; to-day it is a free city in a free country and the gateway of the most progressive nation on the globe. It is cosmopolitan in its make-up, as it is not only the largest American city, but also the largest Irish city, the largest Jewish city, and one of the largest German and French cities in the world.

The development of New York has been unparalleled in the history of cities. In another decade, in point of numbers, it will doubtless lead the world. Let us hope that as it grows older it will grow better, and that the periods of misrule in the past will not be repeated in any administration of its affairs in the future.

The Federation of Civic Forces

At this time argument is scarcely needed as to the effectiveness of combined effort. Combination is no longer on trial, and the lament of the small merchant at the absorption of his trade by the great emporium is simply another form of the lament of the stage-coach driver at the taking of his passengers by the railroad. The well-managed "trust," so-called, is a better business proposition and a better public servant, for it eliminates the waste of unco-ordinated effort, and the world is moving in the line of such elimination.

There are, I believe, some forty known general organizations dealing with civics in various forms. Some are ethical, some administrative, some philanthropic, some artistic, some political. These organizations are effective or ineffective usually as they have strong or weak officers, or scanty or sufficient support. That they all have good and proper aims is undeniable; that these aims could be better fostered by thorough federation, I firmly believe; and that such federated civic effort, as it became fully effective and as efficient as a great railroad system is in handling diverse problems, would point the way toward the far greater governmental problem at which I have hinted, is no less probable.

In urging some discussion and action upon the subject of federation, I am moved to call attention to the greatness of the movement for better conditions all over the country. The people are arousing to their needs, their responsibilities, their opportunities, and the need for wise guidance was never so plain as now. The press is taking up the improvement question, even the greater magazines presenting vairous phases of the movement at considerable length. The Civic Week arranged for at the great Chautauqua Assembly by the American League for Civic Improvement, to begin July 13, is pregnant with far-reaching possibilities. In every direction the good movement gathers strength, and it behooves all of us who, having recognized the need and the opportunity, are accordingly responsible, to push the work forward with intelligence and devotion, until

the greater America shall be cleaned and in its right mind, beautiful and sighly—a model for all nations.

PROPOSED CONSTITUTION OF THE CIVIC ALLIANCE

Name and Objects—The name of this federation shall be the Civic Alliance.

Its object shall be the establishment of a central office in touch with civic effort in all parts of the country, a common bureau of information, open to the accredited officers of all co-operating societies, to the individual members of the Alliance, and to the general public under such conditions as may be hereafter determined.

The design is to bring about a federation of existing organizations, to be supported financially by public-spirited individuals, who perceive in such an Alliance the opportunity to eliminate duplication of effort, and to secure a greater efficiency than is now possible.

Membership—The membership of the Alliance shall be made up of national organizations, of local organizations, and of individuals. The national organizations shall be enrolled as Co-operating Societies. Local organizations and individuals shall be enrolled as Patrons and Subscribers.

Co-operating Societies—Co-operating Societies shall be such national organizations as may accept invitation to enter the Alliance. Each shall appoint one of its members to act on the Board of Trustees of the Alliance, and shall as far as practicable supply the General Secretary with: (1), complete files of its literature; (2), copies of its current publications, as these appear; (3), a complete roll of its members, officers and committees, with corrections as changes occur. Any Co-operating Society may, further, with the approval of the Board of Trustees and on such financial and other terms as may be agreed to by the Co-operating Society and the Board of Trustees, issue its own literature, and carry on its general correspondence through the office of the General Secretary of the Alliance. Such suggested relations between a Co-operating Society and the Alliance shall be purely voluntary on the former's part, and a result of its own initiative. All Co-operating Societies shall share in the advantages of the central clearing-house, to which their accredited officers shall have free access for information. They shall receive copies of reports and literature issued by the Alliance.

Patrons—A Patron shall be any person who at any one time contribute $1,000 or more to the Alliance. Patrons shall receive the annual publications of the Alliance, shall be entitled to vote for Trustees, and at least one of their number shall be a member of the Board of Trustees. The amount received from Patrons shall constitute a separate fund, to be known as the Trustees' fund, and the Treasurer shall keep this distinct from the general funds of the Alliance, and shall invest it with the approval of the Board of Trustees. The disposition of this fund, as to principal and interest, shall be at the disposal of the Board of Trustees, but no expenditure of the fund may be made for current expenses, except by an affirmative vote of three-fourths of the whole Board of Trustees. The names of Patrons shall be published in each annual report of the Alliance, and those who become Patrons before the first election shall be designated as Founders.

Subscribers—Subscribers shall be local societies and individuals, who contribute $25 or more. They shall receive the annual publications of the Alliance, shall have during the twelve months following their subscriptions the benefit of its bureau of information, and their names shall be published in the annual report of the year for which they subscribe. They shall be entitled to vote for the elective members of the Board of Trustees.

Trustees—The Board of Trustees shall be composed of the officers of the Alliance, who shall be members ex-officio; of one representative from each Co-operating Society, to be appointed annually by the Society; and of one Patron, and of one Trustee to twenty Subscribers, the latter members of the Board to be elected annually from the list of Patrons and Subscribers by the votes of the Patrons and Subscribers. They shall be elected in the first instance from a list nominated by the representatives of the Co-operating Societies. After their election, which shall be on a date announced in advance to those invited to subscribe, the President shall appoint a nominating committee of members from the Board of Trustees, and this nominating committee shall make the nominations of Trustees to be elected at the second annual meeting. In addition to the Trustees nominated and elected in this way, any Co-operating Society that may contribute $50 or more to the Alliance in any one year, otherwise than in payment for special services, may have for that year a second representative on the Board of Trustees, this representative to be designated by the Co-operating Society. It shall be the duty of the Trustees to pass upon all expenditures by the Alliance, to audit the accounts of the Treasurer and General Secretary, to have charge of the Trustees' fund hereinbefore described, and to direct the policy of the Alliance. The Board shall hold quarterly meetings; but shall adopt its own by-laws for the conduct of its business.

Officers—The Officers of the Civic Alliance shall be a President, a Vice-President, a Treasurer, and a General Secretary. They shall be elected annually by the Trustees.

General Secretary—The General Secretary shall be elected annually by the vote of the Trustees. He shall be the administrative officer. He shall submit quarterly statements of the work of his office to the Board of Trustees, and an annual report, to be read at the annual meeting of the Trustees. He shall also issue a monthly Bulletin of Information, this to be sent to the Secretaries of the Co-operating Societies, and to the officers of the Alliance. He shall conduct the general correspondence of the Alliance, and shall so compile reports, information, the membership lists, and literature of Co-operating Societies, that these shall be convenient for reference. He shall prepare an annual report, and, when it has been approved by the Board of Trustees, he shall include it in the annual publication of the Alliance, which he shall edit. He shall perform such other duties as may be hereafter prescribed by the resolutions of the Trustees. He shall have such assistance as the Board of Trustees deem necessary.

J. HORACE MCFARLAND.

Franchise Tax Law Sustained

THE constitutionality of the Ford Franchise Tax Law, authorizing a tax upon special franchises such as street railways, electric conduits, or any other granting special privileges in the use of the public highways, has been unanimously affirmed by the judges of the Court of Appeals of New York. This decision ends the fight in so far as New York is concerned. The case may be taken to the Supreme Court of the United States, but it is improbable that the United States Court will reverse this decision, for it has been the rule of the Supreme Court in the interpretation of State law to follow the latest settled decision of the courts of that State.

It will be remembered that the Ford Franchise Law was passed by the New York State Legislature in 1899 for purposes of taxation, including every right to use a public street or highway for purposes of gain, classifying such right as real estate. These were termed special franchises to distinguish them from the general franchises of a corporation. This right to use the streets, whether by a street railway, water, gas, electric light or other company, is something more than the mere right to exist as a corporation. Indeed, it is the main thing which gives value to the corporation. Until the passage of this law the owners of such franchises had never been called upon to contribute to the public treasury an amount commensurate in value to the privileges granted. This law makes special franchises taxable in the same way as the adjoining houses and lots, the value of each franchise to be assessed by public officers.

The value of this decision to New York City alone can best be shown by the following figures, taken from the tax books, contrasting the assessments under the old law with those levied under the first section of the new law in 1903. This list is incomplete, only including the larger corporations:

	1903.	1899.
Broadway & 7th Ave. (Met.)	$ 5,725,000	$ 340,000
86th St.R. R. (Met.)	2,000,000	425,000
Consolidated Gas	14,,800,000	5,785,000
Consol. & Elec. Subway	2,725,000	850,000
Dry D. & E. B. (Met.)	1,400,000	100,000
8th Ave. R. R. (Met.)	4,000,000	500,000
Empire City Subway	3,000,000	1,125,000
42nd St. R. R. (Met.)	2,600,000	130,000
Manhattan R. R.	46,000,000	25,675,000
Metropolitan St. R. R.	15,500,000	2,225,000

New York & Harlem R. R.	10,060,000	3,500,000
New Amsterdam Gas	3,575,000	1,722,000
N. Y. C. & H. R. R. R. Co.	2,910,000	1,500,000
New York Mutual Gas	2,200,000	815,000
New York Edison Co.	8,275,000	2,000,000
New York Telephone Co.	2,625,000	550,000
9th Ave. R. R. (Met.)	1,550,000	280,000
2nd Ave. R. R. (Met.)	4,000,000	350,000
6th Ave R. R. (Met.)	3,390,000	400,000
Standard Gas Co.	2,875,000	1,450,000
23rd Street R. R. (Met.)	1,700,000	100,000
Central Union Gas	1,040,000	260,000
Harlem R. R. & P. C. R. R.	3,515,000	2,225,000
Manhattan Elevated (Bronx)	3,700,000	1,944,000
N. Y. & Harlem R. R. (Bronx)	3,790,000	2,320,000
N. Y. & Putnam R. R. (Bronx)	1,000,000	625,000
Spuyten Duyvil & P. M. R. R. (Bronx)	1,900,000	1,100,000
Brooklyn City R. R.	8,750,000	2,500,000
Brooklyn Union Elevated	6,150,000	3,625,000
Brooklyn, Queens Co. & Sub.	1,225,000	460,000
Brooklyn Union Gas	8,085,000	3,000,000
Long Island R. R.	1,500,000	575,000
Brooklyn City R. R. (Queens)	3,500,000	600,000
Nassau Electric R. R.	4,780,000	1,310,000
Long Island R. R. (Queens)	3,500,000	3,275,000
Staten Island R. R.	1,580,000	1,575,000

Under the operation of the special franchise tax law the total valuation of property in 1900, in the five boroughs of New York, amounted to $219,679,359, yielding a tax of $4,969,748.58; in 1901, total valuation, $211,334,194, tax $4,925,291.84; in 1902, total valuation, $220,620,155, tax, $5,049,106.47.

From the date of the passage of the Ford Franchise Law, many of the corporations resisted the payment of taxes assessed upon this new valuation, but the records of the collector of taxes show that in 1901, the corporations assessed paid into the city treasury $125,000 in taxes, as the result of compromises with the tax officials for the lowering of the assessment. In 1902, the sum of $156,000 was paid by the corporations for franchise taxes. Deducting these amounts from the aggregate tax due for the three years named leaves a balance of $13,940,632.81, which will have to be paid to the city of New York by the corporations now that the franchise law has been declared constitutional.

This defeat of the corporations should encourage other cities to adopt similar measures to compel the corporations to bear their just share of the tax burden.

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The Merits of the Osage Orange as a Shade Tree

The difficulties surrounding the planting of shade trees in cities are so great that they have almost totally discouraged any effort to brighten the barren waste of pavements and brick and stone buildings with these pleasant reminders of the country. The value and need of shade trees in cities is generally recognized. The soil of the city streets is so impregnated with gas and other impurities, and is kept so dry by the pavements, that it is almost impossible to transplant a tree with success, even though the greatest care be taken in the operation. Sufficient fresh earth may be placed around its roots to permit its healthy start, but its enemies, including the small boy, the horse, and numerous insects, are almost sure to kill it in a short time.

There is a tree—the osage orange—with qualities which have long been overlooked, which especially recommend its use in the city. No tree is suitable for all purposes, but this one is suitable for more kinds of uses and has more valuable qualities adapted to use in city streets—not parks—than any other. For instance, it is easily propogated from seeds or cuttings; is a strong, rapid, hardy grower and never blights; will grow in any soil—rich or poor—if not too wet; will thrive in any latitude south of Minneapolis or Boston; will grow upright, straight and symmetrical; has beautiful shiny deep green leaves like the orange tree; will endure a cyclone better than any other tree; has the hardest and strongest wood of any American tree; will thrive in a city where no other tree would live; no bug, worm or insect will touch its root, bark or leaf; no animal will eat or rub against it; never has any disease common to other trees; is sure to grow while a large per cent. of others die; has roots which run deep and are not affected by drought.

When young it has sharp spines which is the chief reason why it has not long since come into general use as a shade tree. These sharp pines are the tree's natural means of protecting itself while it is young; later the spines are shed from the trunk. It has long been appreciated as a hedge plant, but it is not generally known that it will grow to the size of a tree and can be used as a shade tree. It is so much more valuable than other woods that railroad men give double price for ties which are made of this tree, and, for some time, railroad companies in the west have been planting the osage orange along their lines for ornamental purposes and for timber. We suggest that the various tree planting associations and others who are interested in planting trees within city limits use the osage orange.

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Deadly Work of the Fenderless Car

The newspapers continue to chronicle, almost daily, the serious or fatal injury of one or more persons, somewhere within the bounds of Greater New York, by the fenderless trolley car. Sometime within the next ten years, perhaps, the city government may deign to do something forcible to prevent this daily slaughter. But the city government is so ponderously slow in its movements that we have grave doubts as to whether anything will be done before the end of the present decade. As it is a matter of life and death, we think it would be a pertinent subject for Mr. Low to investigate and act upon immediately. New York is not the only city thus afflicted; accidents occur with more or less frequency in every city, town and hamlet traversed by the motor car. The urgency of the case calls for radical and immediate action on the part of all city officials throughout the country. City officials would act wisely if they called for the immediate equipment of every car with a decent fender.

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Chicago Can Now Operate Its Street Railways

By an act of the Illinois State Legislature duly signed by Governor Yates, all the cities of that State are granted the right to own, operate or lease their own street railway lines as may be deemed expedient. In case the city choses to lease the lines to a private corporation the law stipulates that it shall be for a term not exceeding twenty years. This is the first State to definitely enact a law permitting such control of street railway lines. There are several states in the Union whose laws do not prohibit the ownership and operation of street railways or any other quasi-public utility if cities of a certain class so elect. For instance, San Francisco recently voted on the question of owning and operating a certain line within its limits and lost. Detroit has had a similar experience; but whenever the question has been passed upon by the voters of Chicago it has been approved by overwhelming majorities.

The enactment of the Mueller Bill in Illinois will forever prevent the granting or renewing of long-time street railway franchises in any Illinois city. The passage of this bill was secured in the face of the most strenuous opposition, particularly of the Chicago street railway companies, who were made the more earnest in their fight against its passage because its success meant the end of their long-term franchises.

The citizens of Chicago have succeeded in doing what New York City failed to do during the last session of the New York Legislature. The Illinois bill possesses many of the features of the Elsberg Rapid Transit Bill which was considered in New York but defeated during the closing hours of the session. Both bills provided for short-time lease and permitted municipal operation in case proper terms could not be secured from leasing companies. While it is not likely that Chicago will undertake to operate its street railway lines, or that New York would do so, the fact that the city has a right to so act, gives the civic authorities the whip hand in all negotiations with applicants for leases.

Law to Correct Drug Sample Nuisance

Thanks to the New York Legislature and Governor Odell, a bill was passed at the last session making it a misdemeanor for anyone to place on door steps or porches samples of drugs or medicines. While this matter had been under consideration, its enactment was hastened by the death of a Brooklyn lad who ate some sample pills left on the door steps, thinking them candies. Some municipalities have ordinances already covering this important matter. We believe that every municipality in the United States should pass an ordinance similar to that just adopted by the Common Council of Rochester, N. Y., the important part of which reads as follows:

"No person shall, without permission from the owner, throw or place, or cause to be thrown or placed, in any yard, doorway, porch, house or vestibule, any sample or sample package of medicine, or any substance, dodger or handbill which may litter such place or cause annoyance or inconvenience to such owner or occupant."

We see no reason why every municipality should not be able to give this hearty indorsement. We believe it will be conducive not only to municipal cleanliness, inasmuch as it would abate the waste paper nuisance on the street, but also put an additional safeguard around the lives of the children.

The New Asphalt Trust

The General Asphalt Company, with a capital of $31,000,000, was incorporated last month at Trenton, under the New Jersey laws. Of the capital $14,000,000 may be 5 per cent. cumulative preferred stock. Provision is made for the conversion of preferred stock into common stock at the option of any holder or holders. The incorporators named were Samuel B. Lawrence, John B. Summerfield and Alfred T. Davison, of New York; R. J. Wortindyke, of Jersey City, and Henry A. Bingham, of Orandell, N. J. These incorporators are simply "straw" men and will give place to the real board of directors when the formality of accepting the charter and organizing the company for business shall be accomplished.

Almost simultaneously with the chartering of the new asphalt company at Trenton, settlement was being made in New York by Henry C. Everdell, for the securities and assets of the old asphalt trust, which he had purchased a few days previous at the foreclosure sale of the Asphalt Company of America and of the National Asphalt Company, for $6,006,000.

As promptly as a few remaining details and formalities can be arranged the asphalt securities and assets—exclusive of such of them as may not be desired, which will be put back upon the receiver—will be turned over to the General Asphalt Company as its property. In payment therefor stocks of the new corporation will be issued in bulk to the aggregate amount necessary. This will complete the formal launching of the new asphalt trust and the cities of the country may expect a continuance of the methods of the former trust.

Good Work of Garbage Crematory

Editor, MUNICIPAL JOURNAL AND ENGINEER:

The enclosed table of the cost of garbage disposal in the city of Norfolk, Va., for the past ten years may give your readers some valuable information in regard to the cost of this work.

In 1892, an Engle garbage crematory was constructed at Norfolk by Messrs. Morse and Boulger; the entire plant—furnace, house and approaches—costing only $6,500. The capacity of this furnace was fifteen to twenty tons per day, and the population of the city was, at that time, about 34,000. At present the population is 50,000. During the first three years all the refuse of the city, in addition to the garbage, was brought to the crematory, but in the following years it was found that it could receive the garbage only. Consequently the tabulated amounts for the first three years are larger than for the following ones.

In 1896, the furnace was operated by a contractor who made no reports of costs or quantities, and who left the furnace in very bad condition, as is shown for the reports for nine months of the following year. The expenses for repairs included re-lining the furnace and furnishing new steel stacks in the years 1894 and 1898. An examination of this furnace, made last month, shows that it is in a condition to go on for some time longer, but it is found to be too small for the present population of the city. The total cost for eight years and nine months for fuel, repairs and labor is $29,336.34, and the amount destroyed was 58,793 loads of 41 cubic feet each, weighing 2,275 pounds each. In addition to this there were a large number of barrels of condemned meat and vegetables from storage warehouses, bodies of animals, and much infected clothing and household furniture during epidemics, not included in the report. The total cost of operating expenses and repairs is 50c. per load, or 49c. per ton.

The operation of the furnace has been conducted by one man and an assistant during this entire period, and the care of the furnace has been under the oversight of the City Engineer, W. T. Brooke, C. E.

The site of the furnace is on the edge of a marshy piece of ground belonging to the city, and the ashes from the destructor, together with a proportion from the neighboring houses, has filled this piece of ground—about four and one-half acres in area—the increased value of which would very nearly suffice to pay the cost of the whole disposal work during the ten years.

This report, compiled by courtesy of the City Engineer and taken from the official records, is a demonstration of the fact that the adoption of a crematory furnace has been of very great advantage to the city and has nearly paid for itself in the value of the ground made from its ashes; has been a means always at hand for the destruction of infected matter, which has greatly aided in the suppression of epidemics, and, by reason of its central location, decreased the cost of transportation of the garbage.

These figures for operating expenses have not, I believe, ever been equalled by the reports of any other garbage crematory in the United States. If any other city can show an equally good report for the same period it would be interesting to have it presented.

WORK OF ENGLE CREMATOR AT NORFOLK, VA., FROM 1893 TO 1902, INCLUSIVE.

Year.	Total.	Cost of Coal Consumed.	Cost of Labor.	Repairs and Sundries.	Loads.
1893	$3,621.53	$1,254.50	$2,169.88	$197.15	8,756
1894	4,065.30	1,254.00	2,033.50	*777.80	8,030
1895	2,843.03	991.00	1,707.10	144.93	8,916
1896	No returns—operated by contractor.				
†1897	2,029.54	500.96	1,187.59	340.99	4,100
1898	3,500.41	897.59	1,757.07	‡845.75	5,479
1899	2,966.78	814.05	1,978.75	173.98	5,719
1900	3,249.43	1,104.86	1,959.75	184.82	5,883
1901	3,755.77	1,375.95	1,951.00	§427.82	5,910
1902	3,204.55	1,043.40	1,991.00	170.15	6,000
Totals	$29,236.34	$9,237.31	$16,735.64	$3,263.39	58,793

* Repairs include new steel floor and drains. † For nine months only—furnace left in bad condition by contractor. ‡ Furnace relined, new stack, platform, etc. § New grate bars, castings, roof repairs, etc.

W. F. MORSE.

Convention Dates

JUNE

The American Society of Civil Engineers will meet at Asheville, N. C., on June 8th to 12th. Charles Warren Hunt, 220 W. 57th street, New York city.

The Canadian Electrical Association will hold its annual convention at Toronto, Ontario, June 10th to 12th. C. H. Mortimer, Toronto, Ont.

The New England Water Works Association will hold its monthly meeting on June 10th at Norumbega Park.

The annual convention of the North Dakota State Firemen's Association will be held at Whapeton, N. D., on June 17th to 19th. H. L. Read, secretary, Bismarck.

The State Firemen's Association of South Dakota will meet at Chamberlain, S. D., June 9th to 12th. J. H. Pettibone, secretary, Sioux Falls.

The Minnesota State Firemen's Association meets on June 12th at Brainard, Minn. R. O. Strong, secretary, St. Paul.

State Firemen's Association of Maryland meets in annual convention June 16th and 17th at Frederick, Md. W. M. Crimmins, secretary, Frederick.

The American Water Works Association will meet at Detroit, Mich., June 23d to 26th. J. M. Diven, secretary, Elmira, N. Y.

The annual convention of the American Society of Mechanical Engineers will be held at Saratoga Springs, N. Y., on June 23d to 28th. F. R. Hutton, secretary, 12 West 31st street, New York City.

The annual convention of the American Institute of Electrical Engineers will be held at Niagara Falls, N. Y., June 29th to July 3d. Ralph W. Pope, 95 Liberty street, New York.

JULY

The International Fire Prevention Congress will be held in London, England, from July 7th to 10th, in connection with the International Fire Exhibition.

The seventh annual meeting of the American Park and Outdoor Art Association will be held at Buffalo, N. Y., July 7th to 9th. Charles Mulford Robinson, secretary, 65 South Washington street, Rochester, N. Y.

The Nebraska State Firemen's Association will meet at Norfolk, Neb., on July 21st to 23d. E. A. Miller, secretary, Kearney.

The annual convention of the Illinois State Firemen's Association will be held at Champaign, Ill., July 28th to 30th. Walter E. Price, secretary, Champaign.

AUGUST

The State Association of New Mexico Firemen will meet in convention at Santa Fe, N. M., on August 12th to 14th. A. M. Dettelbach, secretary, Santa Fe.

The New York State Firemen's Association meets at Gloversville, N. Y., on August 18th to 21st. Thomas Honohan, secretary, Frankfort.

The annual convention of the State Firemen's Association of Virginia will be held at Danville, Va., August 20th and 21st. G. G. Cummings, secretary, Portsmouth.

SEPTEMBER

The International Association of Fire Engineers will hold its next annual convention at Atlantic City, N. J., September 8th to 10th. Henry A. Hills, secretary, Wyoming, O.

The New Jersey State Firemen's Association meets at Atlantic City, N. J., September 9th. William Exall, secretary, 823 Broad street, Newark.

The National Firemen's Association will meet at Chicago, Ill., on September 28th and 29th. D. W. Gillen, secretary, 176 Monroe street, Chicago.

OCTOBER

The next meeting of the League of American Municipalities will be held at Baltimore, Md., October 7th to 9th. John McVickar, Des Moines, Iowa.

The State Firemen's Association of Pennsylvania holds its annual convention at Allentown, Pa., October 6th to 10th. W. W. Wunder, secretary, Reading.

Personalities

—Mr. William T. Austin was elected mayor of Galveston, Texas, at the recent election.

—Mr. Thomas W. White has succeeded F. F. Hallam as city engineer of McKeesport, Pa.

—City Engineer Tonson, of Toledo, O., recently handed in his resignation to the Board of Public Service.

—City Engineer H. C. Thompson, of Bay City, Mich., was re-elected for the ensuing year at a salary of $1,200.

—Election returns in Omaha, Neb., show that Mayor Frank E. Moores was re-elected by a substantial plurality.

—Mr. Matthew B. Cowden was re-elected city engineer of Harrisburg, Pa., for a term of three years. His election was unanimous.

—The Council of Butte, Mont., confirmed the appointments of Mr. Patrick H. Sidley as city clerk and of Mr. J. R. Mullin as street commissioner.

—Mr. John W. Alvord, of Chicago, Ill., was chosen by the Omaha Water Board as the appraiser for the city on the board of three to determine the value of the waterworks plant.

—City Clerk Charles H. Nauts has been re-elected by the new Council of Toledo, O., and his salary fixed at $2,500. His title hereafter will be city auditor instead of city clerk.

—Hon. George Hall was elected mayor of Ogdensburg, N. Y., on the Democratic ticket. The measure adopting free text books in the public schools was carried by a large majority.

—The Councils of McKeesport, Pa., have elected the following officers for three years: City Engineer, Thomas White; City Solicitor, William E. Newlin; Water Commissioner, William Evans.

—The Board of Public Service, of Sandusky, O., has appointed John W. Miller superintendent of public works at a salary of $1,800, and Mr. Jacob Roth as superintendent of parks at a salary of $800 a year.

—The new Council of Canton, O., unanimously re-elected Charles S. Loyd city clerk. The city treasurer will be Thomas J. Bidwell; city auditor, Armstrong Ashbrook; and city solicitor, Andrew C. Hughes.

—Mr. C. C. Wright and C. O. Lobeck were elected city attorney and comptroller, respectively, of Omaha, Neb. Messrs. A. H. Hennings and William H. Elbourne were elected city treasurer and city clerk, respectively.

—After a hot political fight, Mayor P. M. Brown was re-elected as head of the municipal government at Charlottesville, Ga. Mayor Brown's victory is construed as an indorsement of the rigid reform measures inaugurated two years ago.

—Nearly all the old city officials of Racine, Wis., have been reappointed by the Council. Among those that are to succeed themselves are: City attorney, M. E. Walker; city engineer, P. H. Connoly; commissioner of public works, David Rowlands.

—Municipal elections in Baltimore, Md., last month resulted in the selection of Robert M. McLane for mayor on the Democratic ticket and of George R. Heffner for comptroller on the Republican ticket. A Republican, E. Clay Timanus, was elected president of the second branch of the Council.

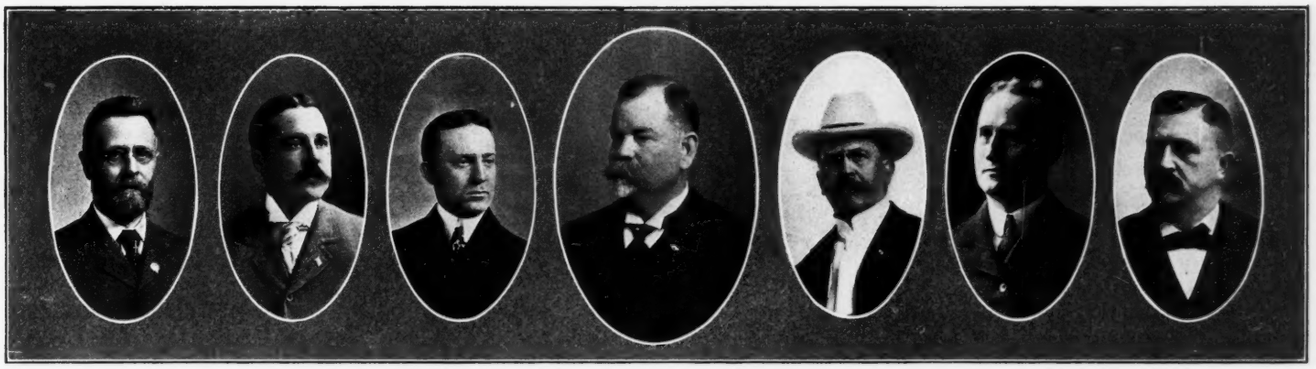
—Mayor Rolla Wells, of St. Louis, sent the following appointments to the Council: Water commissioner, Ben. C. Adkins; street commissioner, Charles Varrelmann; city attorney, Thomas L. Anderson. It was said that this was the first time in ten years that the list of appointments of the Mayor was unknown before it reached the Council for confirmation.

—The special committee appointed by the aldermen of Mount Vernon, N. Y., to investigate the charges against City Clerk William K. Hoyt that he failed to cancel taxes paid by him for a client and that he is not under proper bonds, reported exonerating Hoyt. It was found that it was not his fault that he is not under bonds and, while the taxes were not cancelled on the books, a record was made in his cash book.

—Mayor Maybury, of Detroit, says that he must see what the city is getting before he approves of the city spending $118,000 for asphalt. He is not satisfied with the asphalt pavements that have been laid lately, and he considers it best than an asphalt expert be secured to determine the quality of every bit of asphalt laid. Toledo has purchased an asphalt plant and the Mayor will visit that city to see how successful it is.

—Urbana, O., has the honor of having two mayors as a result of the recent election. Mayor L. P. Stone, Democrat, who was elected in the spring of 1902 for a term of two years, refuses to vacate his office to Mayor James B. Johnson, Republican, who was elected in April. Mayor Stone holds that as he was elected for two years he will not vacate the office until another year has passed, and that he will at least hold the office until the case has been decided by the Supreme Court of the State.

—Mayor Thomas M. Osborne, of Auburn, N. Y., took the place of the regular pastor of the First Universalist Church there recently and delivered an address on "Municipal Reform, What It Is and How to Get It." The Mayor read extracts from an unpublished magazine article by Josiah Flynt, who had visited Auburn at His Honor's request to investigate municipal affairs there. The report was not at all flattering to the city. The Mayor gave a general resume of the work that had been done, and said that reform was needed in the system by which the city was governed, especially in reference to the keeping of accounts. He said the most effective way to get reform was to put good men in office, and then see that they worked for the city and not for themselves.



Officers of American Water Works Association

From left to right: J. M. Diven, Secretary-Treasurer, Elmira, N. Y.; Morris R. Sherrard, Vice-President, Newark, N. J.; Ben C. Adkins, Vice-President, St. Louis Mo.; C. H. CAMPBELL, PRESIDENT, Charlotte, N. C.; L. N. Case, Vice-President, Duluth, Minn.; Chas. E. Rowe, Vice-President, Dayton, O.; E. F. Frailey, Vice-President, Lancaster, Pa.

MEETING OF AMERICAN WATER WORKS ASSOCIATION

ALL the arrangements have been made for holding the twenty-third annual convention of the American Water Works Association at Detroit, Mich., June 23-26, 1903. The following is the programme:

"Some Peculiar Features of Foreign Supplies," illustrated with lantern slides, by Prof. W. P. Mason.

"Specifications for Cast Iron Water Pipe," by J. T. Fanning.

"Supply for Which a Water Works Should Be Proportioned," by Stephen E. Babcock.

"The Necessity of a Systematic Inspection of All Services and Fixtures," by Henry C. Hodgkins.

"Water Rates in Large Cities and Classification of Accounts," by H. O. Nourse.

"Plumbing Rules and Regulations," by Dow R. Gwinn.

"Little Falls Filter Plant," illustrated with lantern slides, by George W. Fuller.

"A System for the Purification of Water and Sewage," illustrated with lantern slides, by John Jerome Deery.

"Water Used in Flush-tanks, Drinking Fountains, School Houses and Other Public Buildings," by Howard A. Dill.

"Water Waste and Its Prevention" by William S. Crandall.

"A Simple Device for Testing Fire Hydrants," by Emil L. Nubling.

"Some Recent Effects of Electrolytic Action on Underground Mains and Other Metals," illustrated with lantern slides, by A. A. Knudson.

"Meter Location and Meter Accounts," by S. A. Charles.

"Preliminary Steps to Be Taken in Water Supply Investigation," by L. J. Le Conte.

"Depreciation," by John W. Alvord.

Secretary John M. Diven writes: "One session of the convention will be devoted to private fire services. The insurance men have been invited to join us in discusing this question, and they have quite generally responded, signifying their intention to be present and take part in the discussion. The importance of this subject is well known to all waterworks men, and it is probable that other Water Works Associations will join us. You are particularly requested to discuss this question. It has been said that the insurance men are better talkers than we are, hence the more necessity to be well prepared. Collect all the data you can, make a note of all cases that have come under your observation of surreptitious use, or stealing, of water from fire services; of fires that you know to have occurred in factories or other buildings supplied by such services, especially those having automatic sprinkler systems, noting particularly any impairment to the general service by reason of such fires. If you have in use any special device for controlling such services or for detecting leakage or 'stealage' from them, bring or send description and drawings. If you cannot come to the Convention, and have anything of interest on this subject, send it.

"If you have anything for the 'Question Box' send it now; it will give members a chance to study it and give much better answers than they could at the Convention without previous preparation. The questions received early enough will be sent out with the programmes.

"If you know of any recent legal decisions affecting waterworks, send them to the Secretary, and send to Mr. Dabney H. Maury, Chairman of the Committee on Electrolysis, any experience you have had or any unusual cases you may have heard of. His address is Peoria, Ill.

"The report of the committee on 'Specifications for Cast Iron Water Pipe' will be finally disposed of at this Convention. You will find the report at page 123 in last year's Proceedings. It is a question of considerable importance and should have careful consideration and debate before any final decision is reached."

MAYOR W. C. MAYBURY, Detroit.

The headquarters will be at the Cadillac Hotel, where all members should register immediately upon their arrival. Space has been reserved for two hundred and fifty members. Full particulars as to hotel rates and railroad fares can be secured by applying to Secretary Diven, Elmira, N. Y.

The members of the association will be the guests of the Board of Water Commissioners, which, backed by the city, will be sure to give the visiting delegates a warm welcome, a splendid time and send all away with only pleasant memories of their brief sojourn within the gates of Detroit.

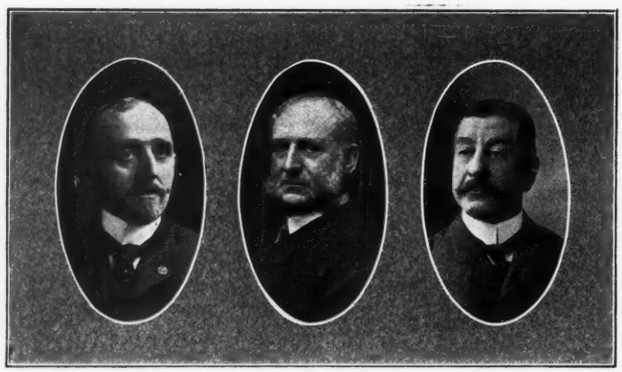
The city of Detroit has one of the best water plants in the country; there is no better or cheaper service. It draws its supply from the Detroit River, and, therefore, has no reservoir and relies upon direct pressure for distribution. It has one large station, with sufficient capacity to provide for emergencies. The station is equipped with four large pumps having an aggregate capacity of 102,000,000 gallons. The total pumpage for the year ending

July 1, 1902, amounted to 18,333,104,706 gallons, of which all but 4,374,233,216 gallons were unmetered. The city covers an area of twenty-nine square miles and has a population of 326,703, with an average daily consumption of 50,200,204 gallons and a per capita daily consumption of 153 gallons.

The total receipts for the fiscal year closing 1902 amounted to the sum of $631,036.40, of which $80,000 was received from the village of Woodmere and $70,082.61 from the village of Hamtranck, or a total of $150,082.61 from outside sources.

The total expenditures for the same period were $643,542.46, of which the sum of $450,639.91 was expended for construction; $124,959.44 for operation and maintenance; $55,573.62 for interest; $4,369.49 under the Hurlbut will, and $4,000 for bond purchase.

The total number of families on the assessment rolls July 1, 1902, was 64,824, an increase of 2,443 over the previous year. At the close of the last fiscal year there were but one hundred and six families within the corporate limits not supplied with water.



Detroit Water Works Officials

From left to right: B. F. Guiney, Secretary of Commission; E. W. Pendleton, President of Commission; H. S. Starkey, Gen. Manager, Water Works.

The Board of Commissioners evidently does not believe in the use of meters, as there are only 5,738 in use. Bituminous coal—the run of the mine—is used, which costs $2.31 per ton in the sheds. The total cost of fuel consumed for the last fiscal year—including heat and light for the library and greenhouse—amounted to $24,830.79. There are 59,225 service taps, 7,016 gates, 3,613 fire hydrants, and 581 miles of mains.

The total valuation of the works at the close of the last fiscal year, including real estate, buildings, distributing system, meters, office furniture, tools, materials on hand, etc., aggregated $6,611,336.29, of which $2,205,108.83 was expended for the pumping works.

PURE WATER SUPPLY FOR TOLEDO

THE report of the advisory board for the consideration of the waterworks problem of Toledo, O., is a resume of the work done along these lines and the investigation made looking towards a filtration plant. The plans submitted by the Engineering Commission are recommended for adoption. This Commission, consisting of Messrs. Allen Hazen, G. H. Benzenberg and W. G. Clark, made their investigations last year and submitted a report covering all the available sources of water supply for the city.

The report stated that the present supply was impure and unsafe and should be purified. The rapid growth of the city in the past and its future increase—estimated at 412,000 in 1940—would point to an average daily consumption in that year as 41,200,000 gallons. The available sources of supply were divided by the Commission into two classes: Ground water and surface water. In the first class considered were: (1) artesian well supplies, (2) that taken from the sand beds in four townships, and (3) that collected by wells from the sand or gravel beds of the islands and in the river. The surface waters were those (1) from Lake Erie, (2) from Swan and Ten Mile Creeks, (3) from the Maumee river, and (4) from the Miami and Erie canal.

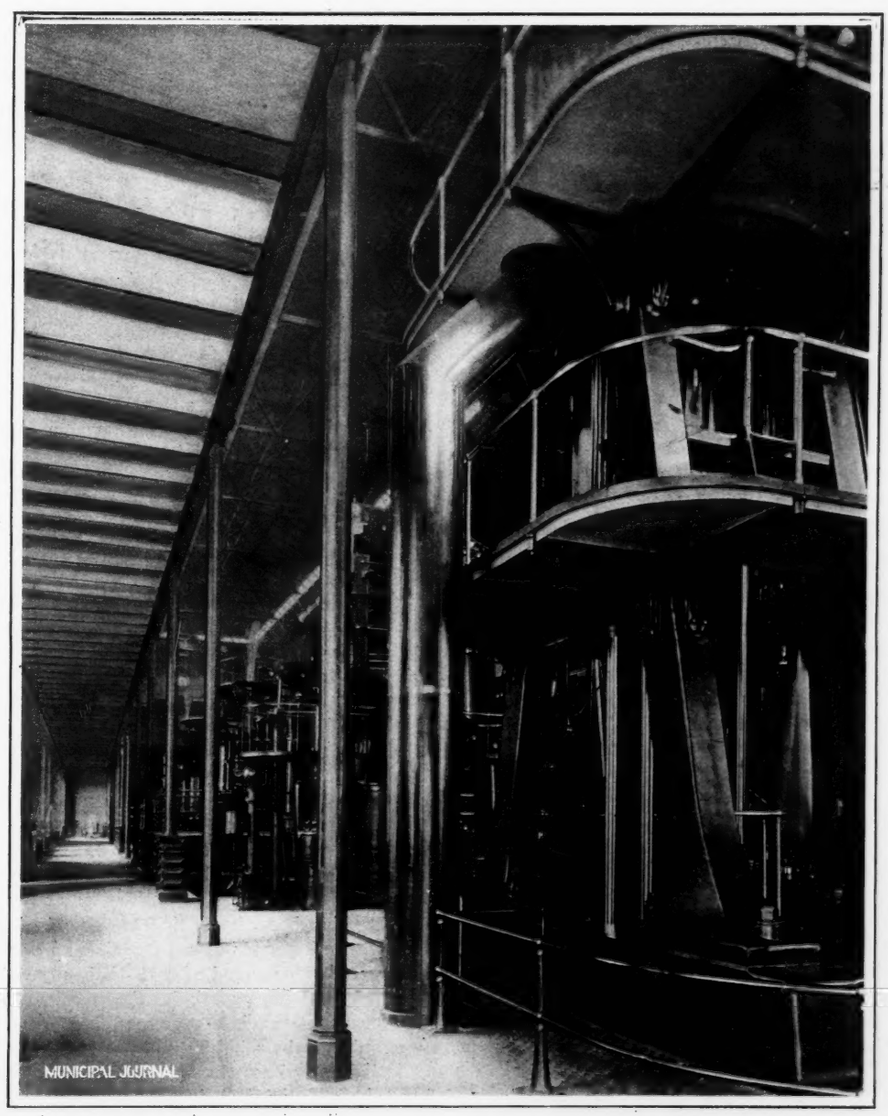
The Commission examined each of these in turn and, concerning the artesian wells, stated that not even a temporary supply of satisfactory water could be secured from them. Samples of water taken from the sand beds proved to be of great purity and softness, but limited in quantity and difficult of access. Only about 400,000 gallons a day could be depended upon from a square mile of sand bed and 100 square miles would be required to supply the quantity necessary for the year 1940. This water would have to be stored in covered reservoirs which would cost too much to be considered.

The third source of obtaining ground water was from a well system on islands, from filter galleries on islands, and from filter galleries under the river. Tests of water from the first showed the

NEW PUMPING STATION, DETROIT WATERWORKS

presence of iron in such quantities that it could not be used unless treated and this would not pay, it being better to treat the river or canal water direct. The available filtering area in filter galleries on islands would not be sufficient, the iron would have to be removed and storage of the water would involve a covered reservoir to prevent growth of organisms. The water from filter galleries under the river would be no better than that from the islands.

The first of the surface waters to be considered was that from Lake Erie. The dangers from the use of this water lie in the contamination of Toledo's sewage and the turbidity that is usually present. Consequently this water would have to be filtered before using and the Commission suggested the use of covered sand filters such as are in use in Philadelphia. A covered clear water reservoir should be constructed near the filter beds. A supply of clear, pure and wholesome water could be secured in this way. The water from the Ten Mile and Swan creeks would have to be filtered similarly to that from the Lake as it would be turbid and subject to pollution and large impounding reservoirs would have to be built to hold the flood waters as the ordinary flow of the creeks would not be sufficient. If the present source of supply from the Maumee river were continued, purification works must be constructed. This water is hard, saline and polluted by sewage. Its turbidity would require the use of a coagulent in filtering and the storage of the water for subsequent sedimentation. Water from the Miami and Erie Canal would be similar to that from the Maumee river when it comes and must be similarly treated.



VIEW IN ENGINE ROOM, NEW DETROIT WATERWORKS

Having considered the quantity and quality of the water from different sources, the cost of placing it in proper condition and within the reach of the city was then considered. The total estimated cost of using the Lake Erie water was placed at $2,173,754 and $3,121,923, accordingly as the old routes to the pumping station were used, or a new station erected in a different locality. The Swan creek scheme would involve an expenditure of $2,398,660 and that of the Maumee river of $1,204,390. In each case, however, considerable deduction from the present cost could be made, these amounts being for works affording a supply sufficient for the population of 1940. The cost of operation plus the interest and sinking fund payments would amount in 1904 and 1940 respectively to $124,934 and $205,893 for the Lake Erie first route; $117,711 and $192,581 for Lake Erie, second route; $64,670 and $160,371 for the Maumee; and $109,374 and $155,633 for the Swan creek scheme. The latter figures are given for 1930 only.

Taking into consideration all the points of the different supplies, the Commission recommended that the water from the Maumee river be continued and that the necessary purification plants be constructed to make the water pure and wholesome. Provision should be made so that, if at any future time the water of the canal were needed, suitable connections could be made between the canal and the coagulation basins, a reduction of about $2 per million gallons in cost of operation could be effected if the water were drawn in this way.

The pure water advisory board has reported to the water works trustees of the city that the recommendations made by the experts should be adopted. They favored the supply from the lake, but the cost would be too great.

Combination Water Supply for English Cities

An immense water supply scheme has been planned for the cities of Nottingham, Leicester, Derby and Sheffield, England, the valley of the River Derwent in Upper Derbshire, thirty to forty miles northwest of Nottingham, forming the watershed which is to be drawn upon by the cities named. The Derwent Valley Water Board has been formed and $486,600 have been spent on preliminary surveys. Sheffield lies ten miles, Derby thirty miles, Nottingham thirty-five and Leicester fifty miles from the water supply. Parliament gave the Board the right to acquire an area of fifty square miles in valleys of the Derwent and Ashop and the cost of the entire scheme is placed at $50,000,000. The water supply that will be brought to the cities will be practically inexhaustible as the yearly rainfall is copious and a minimum of fifty inches per year for dry years has been averaged. This will afford about 50,000,000 gallons per day for storage purposes. One-third of the supply furnished by the Derwent must be returned, but of the amount left Leicester is to have 35.72 per cent., Sheffield and Derby 25 per cent. each, and Nottingham 14.28 per cent. The cost of the works will be apportioned in the same way.

There are to be five reservoirs as follows: (1) One having a

storage capacity of 1,886,000,000 gallons with a dam 114 feet high and 1,090 feet long; (2) one a capacity of 2,495,000,000 gallons with a dam 113 feet high and 1,080 feet long; (3) another a capacity of 2,495,000,000 gallons with a dam ninety-five feet high and 1,950 feet long; (4) another with a capacity of 1,472,000,000 gallons with a dam 108 feet high and 840 feet long; (5) and still another with a capacity of 2,160,000,000 gallons with a dam 136 feet high and 980 feet long. All the water will be filtered and filter beds fourteen acres in extent are to be constructed. It has been estimated that over 2,000,000 tons of stone will be used in the dams and forty-two acres of quarries have been purchased in the neighborhood to supply the demand. A railroad, seven miles in length, has already been constructed for present and future use in connection with the reservoirs.

It is calculated that the work will consume twelve or fourteen years and a town has been built for the small army of men to be employed. The houses have been made of galvanized iron, lined with board and are made for married men and their families as well as for single workmen. Sanitation and sewerage have been carefully looked after and a school, hospital, concert hall, and a church have been installed. Stores, a post-office and a force of police complete the equipment for this town that already numbers 600 and will be largely increased as the work progresses.

Heat and Power from Waste

EXPERIMENTS recently conducted in New York are likely to prove of far reaching importance to other municipalities, for Dr. John McGaw Woodbury, Commissioner of Street Cleaning, has successfully demonstrated that the waste gathered up by the "white wings" under his command is of sufficient value to be a source of profit instead of an expense to the city. This waste, which includes everything gathered by the street cleaning force, except ashes and garbage, has heretofore been carried to sea and dumped at an expense of about 19 cents a cubic yard, or an aggregate of about $150,000 a year. There are 2,500 tons of this sort of refuse collected every working day in the city, and as Dr. Woodbury's experiments show that every cubic yard, weighing 150 pounds, will generate two horse-power, evaporating sixty-four pounds of water, at a cost limited to the labor expense and the interest on the incinerating plant, it will be seen readily that there is a wide margin for gain to the city in his plan. The first experiment was devoted entirely to disposal of the refuse, the heat being regarded as a by-product, and only enough steam being made to run the engine which handled the belt conveying the refuse, the other by-product, ash, being given to the park department and used with much success in revivifying and fertilizing the worn out lands of Central Park. This ash, later tests showed, was not only valuable as a fertilizer, but was worth in the manufacture of potash from $10 to $12 a cord, or practically the commercial value of Canadian wood ash.

The plant used by the Commissioner was of the most primitive sort, the smokestack being so defective that, while the heat in the lower combusion chamber was 1,300 degrees, the base of the stack showed by the pyrometer 880 degrees, and the top of the stack 780 degrees, the larger part of which would have been saved by a stack of proper construction. The material is fed into a furnace having wrought iron grate bars in the upper and firebrick grate bars in the lower combusion chamber. The heat generated passes underneath a boiler of the return tubular type, then through the tubes and flues of the boiler. There is no odor from the combustion of the rubbish, and no smoke more than is made by an ordinary house chimney. The power obtained from this plant goes to waste at present, but this is not likely to be of long continuance, as the Commissioner has several ideas for its use, or he will sell the material. In discussing the possibilities of profit to the city in this method of disposing of rubbish, Commissioner Woodbury said:

"The interest in these experiments is that you are taking absolute waste, which it has been an expense to dispose of, and doing something with it. I have fuel which is about the value of wood. The experimental plant shows that it is a great mistake to throw this material into the sea. There is enough of it to furnish heat sufficient to run the water plant of the city, and to run the greater part of a city lighting plant, if the city ever gets one. Bradford, England, is lighted in this way, why not New York? The heat produced can be supplied to factories, or the rubbish supplied to some manufacturer wise enough to see the saving in cost over the price of coal. The heat units are here, and the evaporation is here. The question is, does the city want it? At present it costs 19 cents a yard to throw the rubbish into the sea, and horse-power sells for $42 a year. The objection made by Mr. Pegram, chief engineer of the Manhattan Railway Company, as to the bulk of the stuff and the room it would take up, can be met by his own suggestion to compress it, but what I want is for the people who could use it to take it and compress it for themselves. I am willing to bring the material that has been gathered to the companies for nothing for three months, and then they can decide what to do with it. Even if I cannot get a cent for the fuel sold, or the heat furnished," continued the Commissioner, "the city will be about $150,000 a year to the good to get rid of it for nothing. If I can get only a cent a cubic yard for the rubbish it means an income to the city of nearly $90,000 over the saving in cost of dumping at sea, and that is an item worth considering.

"In this experimental plant we have derived two horse-power to the cubic yard from the combustion of this material. That is, one-half of a cubic yard evaporates thirty-two pounds of water. The water taken from the main is metered, then run over a mercury holding thermometer, which gives the temperature of the water on entering the boiler. The safety valve is set to blow off at ten pounds of pressure, and the sum is to find how much material is required to evaporate the thirty-two pounds of water necessary to make one horse-power, and is easily found. These experiments have been made with the assistance of Professor Parsons, of the steam engineering department of the Troy Polytechnic Institute, and N. S. Hill, chief engineer of the department of water, gas and electricity, and are being conducted by Engineer Stearns, of the street cleaning department, with Battalion Chief Guerin, of the fire department, a careful watcher. They are entirely satisfied with the results so far obtained, and with an incinerator and a smokestack built for the purpose, so that there would be no appreciable waste of heat, the results would show a much higher degree of effectiveness in the production of heat and power."

The Commissioner added that the cost of final disposition of the ashes and rubbish waste of the city for 1901 was $577,274, while the cost in 1902 was only $547,011, to which should be credited the value of the new land created at Riker's Island, where the city has been filling in a large space enclosed in a bulkhead.

As an answer to objections regarding the handling of loose bulky matter which some of the engineers who have inspected the operation have raised, Commissioner Woodbury has arranged for an hydraulic press with a pressure of 7,000 pounds, and will compress the rubbish with a binder of bitumen into blocks about the size of a paving stone, and these will be tried at the water pumping stations, under the direction of Water Commissioner Monroe. In speaking of this phase of the business, Commissioner Woodbury says: "I hope to be able to sell these bricks at four or five cents each in the city and three or four cents each outside of the city, and the product of the city's streets, which includes store sweepings, household waste, and stuff of that sort, can be raised to a million cubic yards a year, the amount now running between 875,000 and 900,000 cubic yards annually. It has been shown that one pound of this stuff evaporates one and one-fifth pounds of water against an evaporation of seven pounds of water by one pound of coal. When the difference in price is considered the figures speak for themselves.

Among the engineers present at the tests the opinion was expressed that the rubbish was better fuel than was used in many electric lighting plants throughout the country, and that when the city gets its own lighting plant there would be more than sufficient material collected to run both that and the water pumping stations, making an enormous saving in the expense account.

That Commissioner Woodbury has pointed out the way for a big financial profit to the city is conceded, and that other cities are waking up to the utilization of their waste and rubbish is shown by the applications for exact data regarding the manner and cost of operating the plant which have been received.

RECOMMENDATIONS OF MANY MAYORS

New Kind of Pavement—Future Welfare of a City Depends on Good Streets—Bonded Indebtedness Not Necessary—Single-headed Commissions Desirable

A New Pavement Recommended

MAYOR DAVID S. ROSE, of Milwaukee, Wis., recommends in his annual message that a new kind of pavement be tried in place of asphalt. The mayor gave considerable space in his message to the asphalt situation. He said, among other things, that no asphalt should be laid unless of the best quality and that the specifications should be opened so that anyone supplying a good pavement could bid for work. He submitted a substitute pavement which he claimed could be laid for $1.50 a square yard and would stand the heaviest traffic. It would consist of a six-inch concrete basis covered with four inches of crushed stone and surfaced with two inches of crushed granite, thoroughly tamped and rolled. He recommended the refunding of the water bonds so that the money to pay them could be used in other work and in keeping down expenses. The bond issue for the municipal light plant should be increased to $250,000 and passed at once. He favored a municipal coal and wood yard where these materials would be sold at cost and recommended that all unused lands of the city should be sold.

Superior to Grant New Franchise

THE most important measures to be given attention by the Council of Superior, Wis., according to Mayor O'Hare, will be: (1) The refunding of the bonded indebtedness; (2) The improvement of the streets; (3) The granting of franchises for gas and electric power. A commission was appointed to map out a plan for refunding of the bonds and has received several offers at a substantial discount. Bonds may be issued at a low rate to refund the old improvement bonds and the income from licenses is sufficient to pay the interest without additional levy.

All the streets are in bad condition and should be repaved. "The subject of good streets is of the utmost importance to the future welfare of the city, and the Council should be firm in the determination to have the streets improved." The property owners should be consulted in regard to the improvements and the character of the pavement, but if the work is necessary it should be done irrespective of the wishes of the residents. The question of permanent sidewalks should be taken up, the added cost of those made of cement as against wooden walks being outweighed by their greater endurance. A large sum would be saved to taxpayers now paid out in damage suits on account of the old walks.

The question of a franchise for lighting must be considered, as that of the present company will soon expire. The city has been charged $2 per 1,000 feet, but this is much too high and the new franchise should contain provisions for better rates. The mayor is in favor of a long term franchise as tending to secure lower rates for the city.

Fort Worth to Have New Water Supply

THE finances of Fort Worth, Tex., are in fairly good condition and Mayor T. J. Powell states that the city is meeting all its obligations. The greatest economy must be practised by the Council to meet the obligations as they mature.

The streets of the city are in bad shape and they must be improved. The main thoroughfares should be taken care of first and the other streets later. One-third of the expense should be paid by the city and the rest by the abutters. The waterworks of the city are in splendid shape, but it has been a losing proposition because of the fact that it could not furnish a merchantable supply to the citizens. A plan for the increase of the supply was formulated by Mr. Daniel W. Mead, of Chicago, an expert hydraulic engineer. Wells have been sunk and a minimum supply of 3,000,000 gallons a day has been assured. The fact that artesian water is soon to be sent through the mains has resulted in many applications for water connections and the works will soon be on a paying basis. The Mayor thinks that the Mead system will be considered one of the great municipal achievements in Texas.

Among other recommendations are the increase of the police force and the building of a manual training school. The control of corporations owning public service utilities in the city should be in the hands of the city and the charter should be so amended that this would be possible with the ultimate power of municipal ownership. The charter should also provide for direct legislation and all legislative enactments involving taxation or the imposing of burdens on the people should be submitted to them for their approval. No franchise should be granted for a longer period than twenty-five years nor without a percentage of the gross receipts to be given to the city in compensation. Civil Service should be instituted among all the city employees and the department heads should be elected by direct vote of the people. The personal property in the city should be taxed at a fair valuation.

Cities Should Not Have Debts

MAYOR IGNATIUS A. SULLIVAN, of Hartford, Conn., submitted an able message to the Council showing that he has been a student of municipal problems. He endeavored to secure a standard by which the disbursements of the city could be compared and made use of the multiple average method, or relative cost method, used by the United States and European governments. This method consists in taking the expenses of any one year, or the average expenses of a series of years, as a base, or 100 per cent., and then the relative increase or decrease of the other years is easily shown. He estimates the population of the city at 86,365, a gain of 21 per cent. since 1900, and the total valuation is placed at $81,007,361, an increase of 49 per cent. over 1897, which was a year of great activity in the city work. The expenses for 1902 were only 1 per cent. greater than for 1897. The ratios for the different departments as compared with 1897 run from 122 to 214. He claims that the traditions of the city and State have prevented the growth of the same and must be broken through.

He points to the strides taken by municipal government during the last fifteen years, showing that it has become a science and special training is necessary for officials. He holds that, logically, city debts are "relics of the past," and that future cities will not have them. He claims that the idea that coming generations should share in the expense of so-called permanent improvements is a "snare and a delusion," nine-tenths of these improvements not being permanent. Methods should be adopted to obviate the acquiring of such debts.

Provision must soon be made for sewage disposal systems and improved pavements are necessary. He recommends that no more bonds be issued except for bridges and public buildings and that the city be placed on a cash basis. As the same amount of debt has been in existence every year for nearly fifty years, the city's yearly expenses are taken care of each year, and Hartford has borrowed at the end of one to pay for the other, with interest added for which no benefit is received. Instead of appropriating any given amount from the treasury for any department, the Mayor would apportion to each department a certain tax rate, as is now done in the park department. This would compel each department to do its work within the original appropriation.

He further recommends single-headed commissions, appointed by and responsible to the mayor. A large fire-proof building should be erected for the city departments, so that the records would not be subject to the present danger of destruction. A commission of seven should be appointed, without pay, to consider the location of streets. While the streets are well lighted at a fair cost, a municipal lighting plant should be installed in the near future. Instead of carrying a city employee after his usefulness has ceased, all such should be pensioned, as this would be cheaper and better service could be assured.

Municipal Electric Light Plant for Cleveland

THE estimates for the municipal electric lighting plant for the city of Cleveland, O., have been made, and the following elements that enter into these estimates are given in the report of Charles E. Phelps, Jr. An entirely new boiler house is to be built and equipped with a coal handling plant. Coal is to be dumped into bins from the cars and conveyed to bins above the boilers, to which it will be fed through hoppers. The ashes will be removed by an extension of the same system. This building will cost about $50,000. The proper economical unit for supplying the electric current was placed at 1,000 kilowatts, requiring an engine capacity of 1,500 horse-power. Two such units would be needed, one to be held in reserve. The steam plant would include a 1,000 boiler horse-power equipped with mechanical stokers and with economizers to reheat the feed water. The question of reciprocating engines or steam turbines has not been decided, although the adoption of the latter would not affect the estimates of cost. Two units of 1,500 horse-power would be necessary. The piping should be arranged in looping so that duplicate piping would not be necessary.

The equipment recommended would be capable of generating 6,600 volts at sixty cycles, which will give the best possible combination for street and commercial service. A sub-station would be situated on the West Side, which would transform the 6,600 volts from the central station and transform it into a direct current of 250 volts. This station would have 750 kilowatts capacity in rotary converters. The distributing lines should be underground, and from eighty to ninety arcs of closed type could be placed on a circuit. The commercial light and power lines should be of the Edison three-wire system.

The estimate for plant construction was placed at $375,750. The street lighting service would be about 30 per cent. of the total output and should be made to bear that proportion of the operating expenses. This would place the cost of an arc light, exclusive of fixed charges, at $40. The operating expenses are based upon the employment of three shifts and include $10,760 for general expenses, $36,300 for production, $12,615 for maintenance, and $7,240 for repairs and renewals, or a total expense of $66,915. Interest at 4 per cent., plus a 3 per cent. sinking fund, pro-rated between the lighting and commercial service, would bring the cost of each arc up to $53.67.

Franchise and Goodwill Not Salable

THE cities of Connecticut were deeply interested in the findings of the commission appointed to determine on the value of the lighting plant in Norwich which the city had voted to buy. The price asked by the company was $850,000, but the city would pay only $450,000. The findings of the commission was a compromise between these two figures, the sum arrived at being $590,000. The point decided by the commission, which is of especial interest to cities of the State, is the fact that no value is assigned to the franchise and goodwill of the company and therefore should not be sold. The commission based its valuation upon the fair market value of the gas and electric plants for the purpose of their use, including, as an element of value, the earning capacity of the plants, based upon the actual earnings derived from the use of the plants when the city voted to buy. In arriving at the valuation the commission considered: "The location of the plants with reference to the river, the railroad, and the community served by their distribution systems; the value of the land: the structural value of the buildings; the value of the machinery and all apparatus for producing gas or electricity; the distribution system of each of said plants; the present condition of the buildings, machinery and distribution systems, their defects, the changes needed for their reasonable improvement, and the probable result of such changes as bearing upon the output of the plants; the expense of operation, and the opinion of the experts who testified. It has also considered that the plants are growing concerns, and that their output has been increasing, and has taken into account their earning capacity and their actual earnings at the time of said vote (making allowance for depreciation), and the fact that the plaintiff has an established business, built up at the risk of private capital, after experiments and changes during a long period, and has further considered the powers of the State and its policy in dealing with public service corporations."

To Remove Obstacles to Street Paving

OBSTACLES to street paving in cities and towns of Illinois have been removed by the Legislature in the passage of the following bill. Previously the law stopped the city councils from ordering further paving unless petitioned for by a majority of the property owners. This is amended by Section 4 of the new bill, which is as follows: "When any such city, town or village shall, by ordinance, provide for the making of any local improvement, it shall, by the same ordinance, prescribe whether the same shall be made by special assessment, or by special taxation of contiguous property, or general taxation, or both.

"But in cities, towns and villages having a population of less than thirty thousand (30,000) ascertained as aforesaid, no ordinance for making any local improvement to be paid by special assessment or by special taxation of contiguous property shall be adopted unless the owners of one-half of the property abutting along the line of the proposed improvement shall petition for the same: Provided, however, that on a petition signed by one hundred property owners in cities, towns and villages containing a population, ascertained as aforesaid of between thirty thousand (30,000) and fifty thousand (50,000) the question may be submitted to a vote of the people at any general or special election, whether or not said improvements can be made unless the same is petitioned for by at least one-half of the property owners abutting on the line of said improvement, and if a majority of all the votes cast at such election shall be in favor of said proposition, then a petition as hereinbefore provided shall be necessary in such city, town or village, before such an ordinance can be passed.

"Provided, that in cities, towns and villages of a population of ten thousand (10,000) or under no ordinance for making improvement shall be adopted unless a majority of resident property owners affected by such improvement shall petition for the same."

New Way of Treating Small-Pox Cases

WHILE small-pox did not spread to any extent throughout Detroit, Mich., during the last year, the precautions taken by the health department were not relaxed, and to this is no doubt due the small number of cases. Free vaccination was given to all who applied at the office. Of the eighty-three cases, seventy-three were imported. Of the total number, forty-one had never been vaccinated, thirty not since infancy, and eleven not since 1890. These had only mild cases of varioloid. Of the four deaths, two had not been vaccinated and the others not for forty years. The old custom of quarantining patients and all that had come in contact with them was abolished as being oppressive and expensive. In place the following methods were adopted:

"We remove the patients to the small-pox hospital at once, vaccinate all inmates of the house, disinfect the rooms and their contents . . . . thoroughly with formaldehyde, disinfect the persons themselves by means of a bi-chloride of mercury bath, paying especial attention to their hair, and then open the house and do not quarantine. We then keep all persons who have been directly exposed in the house under daily observation for a period of two weeks, so that any possible new cases may be promptly removed. Besides these precautions, we locate as nearly as possible all persons not living in the house who have been directly or indirectly exposed to the patient and vaccinate them, and whenever it is possible disinfect their clothing." The results have been very satisfactory.

Cases of scarlet fever being traced to a milk supply, and due to use of tickets, an ordinance was passed prohibiting the use of any milk ticket more than once. Efforts have been made to instruct the public as to the precaution to be taken against the spread of consumption. A medical inspection of schools is carried on, the air in the rooms has been examined, the milk supply has been very fair and the collection of garbage satisfactory. A number of alleys have been paved, the importance of this work from a health point being

realized by Commissioner of Public Works Moreland. Prevention of smoke has been started. Health Officer Guy L. Kiefer recommends that public baths, lavatories and a communicable disease hospital be erected as soon as possible, as their need is great.

Fixing a Value on a Water Plant

A SUIT brought by the city of Valparaiso, Ind., to determine the value of the plant of the local water company has been decided by the Court, favoring the price fixed by the city. The franchise of the company provided that, after fifteen years, the city should have the right to buy the plant, its value to be fixed by three engineers appointed, one by the company, one by the city and one by these two. When the fifteen years were up, the company refused to sell, hence the suit. The provisions of the franchise stated that nothing was to be paid for the unexpired franchise of the company.

In estimating the value of the plant, the Court considered three things: 1. Cost of reproduction less deterioration, representing the present physical value. 2. The going value. 3. The franchise or commercial value. The company argued that, in order to determine the value of the plant, the net earnings of the company must be accepted as a basis on which to capitalize the plant so as to net an investor six per cent. and from this deduct the value of the franchise. On this theory, the expert for the company valued the plant at $250,000, assuming a net revenue of $16,000 minus $5,000 hydrant rentals. Allowing $90,000 for the franchise, the going value would be $160,000.

Considering the net income as a basis would be all right in a transaction between individuals, but a fair value for purposes of use by the city must be found without reference to future earning capacity due to the franchise which no longer exists. To base the value on the earnings would be valuing the franchise, which would give a market value. The value of a plant above its physical worth is due to its franchise, monopoly and the skill of management, for none of which the city has to pay. The U. S. Circuit Court in the Kansas City case held that a valuation fixed upon capitalization of earnings implies a continuation of earnings, and that rests upon the franchise to operate the works. The "going value" is due to the fact that the plant has a large number of water users and is a live concern. This value with the physical represents what the city should pay. The Court accepted the testimony of Messrs. Mead and Alvord, two hydraulic engineers of experience, as to the value of the plant. They placed the value at $86,706. They arrived at that sum by adding the cost of reproduction ($89,617), minus the depreciation ($33,221), to the going value ($26,710). To this was added for intake and meters $3,600, giving the value to be paid by the city as stated.

Paving Flags from Slag

WHAT to do with the immense amount of furnace slag that accumulates in iron foundries was successfully solved by an English concern, which has converted this slag into paving flags, paving tiles, bricks, etc. The process of making the paving flags is described as follows: The slag is carried to a crusher having a capacity of one hundred tons daily, where it is broken up and then taken to screens where it is graded, the coarse being run into cars to be used as ballast and the rest subjected to further crushing. The excess dust is removed by screening and used for the manufacture of tiles. The slag suitable for paving flags is mixed in a dry state with a cementitious material and then water is added and the whole thoroughly incorporated. A pressure of four hundred tons is exercised upon this mixture by a hydraulic press and all the moisture possible is forced out, leaving a hard, dense block of uniform character.

A different cementing material is employed in making tiles from the dust, the effect being to give the mixture a certain amount of plasticity which allows it to be moulded by mechanical means and permits it setting into a dense mass. If rapidity of production be desired the action of setting can be accelerated by artificial means and the goods made ready for use within twenty-four hours. The addition of coloring material allows the construction of building blocks of various hues. Experience with these slag materials show that exposure to cold and frost has no effect except to produce a greater hardness in the material.

Statistics of Arc Lighting in United States Cities and Towns

	Population, 1900.	No. lamps.		Watts at lamp terminals.		Schedule.	Hours burn per year.	Cost coal per ton.	Contract price per lamp per year.
		Open.	Closed.	Open.	Closed.				
KENTUCKY									
Ashland	6,800	...	60	...	430	(1)	4,000	$0.55	$75.00
Bowling Green.	8,226	72	...	480	...	(2)	2,600	1.75	z
Carlisle	1,377	...	25	...	430	(2)(3)	1,220	2.60	74.00
Covington	42,938	...	600	...	430	(1)	4,000	1.60	90.00
Flemingsburg	1,268	...	7	...	550	(2)(3)	1,000	2.50	85.00
Frankfort	9,487	72	...	480	...	(1)	4,000	2.75	96.20
Georgetown	3,823	...	20	...	...	(1)	4,000	2.30	80.00
Glasgow	2,019	...	12	...	430	(2)(3)	1,220	3.00	116.67
Henderson	10,272	168	...	480	...	(1)	3,280	1.25	z
Hopkinsville	7,280	65	...	480	...	(1)	4,000	1.25	83.33
Lebanon	3,043	32	...	340	...	(2)	2,179	2.75	85.00
Lexington	26,369	303	...	480	...	.....	4,000 2,179	2.20	78.50 59.90
Louisville	204,731	1,500	...	480	...	(1)	4,000	1.50	74.00
Ludlow	3,334	...	5	...	550	(2)	3,200	1.75	60.00
Madisonville	3,628	40	...	480	...	(1)	3,800	.75	85.00
Mayfield	4,081	33	...	480	...	(2)	2,179	1.55	96.00
Maysville	6,423	27	...	480	...	(1)	4,015	1.55	90.00
Owensboro	13,189	120	...	480	...	(1)	3,800	1.00	72.50
Paducah	19,446	150	...	480	...	(2)	3,500	1.20	z 44.00
Paris	4,603	32	...	480	...	(3)	1,825	2.50	80.00
Pineville	2,072	25	...	480	...	(3)	1,825	1.00	40.00
Shelbyville	3,016	31	...	480	...	(5)	....	2.25	80.00
Vanceburg	1,161	...	6	...	430	(1)	4,000	2.00	75.00
Versailles	2,337	24	...	340	...	(2)	2,179	2.50	90.00
Winchester	5,964	56	10	340	...	(2)	2,179	2.35	80.00
LOUISIANA									
Hammond	1,511	...	5	...	550	(3)	1,460	3.00	96.00
Jennings	1,539	...	8	...	550	(2)	4,300	Oil	75.00
Lake Charles	6,680	42	2	225	...	(1)	4,380	4.13	55.00
New Orleans	287,104	1,644	...	480	...	(1)	4,000	3.075	118.50
MAINE									
Auburn	12,951	...	106	...	...	(2)	2,179	W. P.	37.00
Augusta	11,683	...	188	...	480	99-(1) 89-(3)	4,000 1,825	W. P.	75.00 65.00
Brewer	4,835	...	30	...	430	(1)	4,000	W. P.	50.00
Berwick	1,377	11	...	480	...	(3)	2,179	(7)	67.00
Calais	7,655	42	...	480	...	(3)	1,825	W. P.	60.00
Eastport	5,311	36	3	340	...	(2)(3)	1,220	W. P.	65.00
Ellsworth	4,297	...	23	...	480	(1)	4,000	W. P.	75.00
Farmingham	1,251	...	2	...	...	(2)(3)	1,135	....	50.00
Norway	2,034	56	1	340	...	(2)(3)	1,900	5.05	35.20
North Berwick.	.....	11	...	340	...	(2)(3)	1,220	....	67.00
Portland	50,145	...	301	...	...	(1)	4,000	W. P.	61.08
Presque Isle	1,256	...	10	...	...	(1)	4,000	(8)	100.00
Rockland	8,150	134	...	340	...	(2)(3) (1)	1,596 4,000	3.41	75.00 100.00
Rumford Falls.	2,595	16	...	340	...	(1)(2)	2,179	W. P.	75.00
Skowhegan	4,266	...	45	...	480	.....	2,555	5.00	50.00
Waterville	9,477	...	100	...	480	(1)	4,000	W. P.	35.00
Westbrook	7,283	...	5	...	...	(1)	4,000	W. P.	95.00
MARYLAND									
Baltimore	508,957	1,393	300	480	480	(1)	4,000	2.875	99.92
Hagerstown	13,591	93	...	375	...	(1)	3,650	2.75	75.00
Lonaconing	2,181	...	18	...	550	(1)	4,000	1.35	61.00
Oakland	1,170	22	...	480	...	(2)	2,600	2.10	56.82
Pocomoke City.	2,124	...	2	...	...	(3)	2,300	3.90	72.00
Salisbury	4,277	...	7	...	550	(3)	2,010	W. P.	54.75
Westminster	3,199	45	...	340	...	(2)	2,179	3.00	60.00
MASSACHUSETTS									
Amesbury	10,000	...	54	...	430	(4)	1,400	4.30	75.00
Amherst	5,000	20	11	340	480	(3)	1,800	4.50	85.00
Attleboro	12,000	90	...	340	...	(2)	1,540	3.83	75.00
Beverly	13,884	...	175	...	350	(1)	4,000	4.00	109.50
Boston	568,892	...	2,975 40	...	480 480	(1) (4)	4,500 2,190	3.25 3.48	125.93 75.00
Brockton	40,063	259	...	340	...	(1)	4,000	4.50	87.00
Brookline	20,000	400	100	...	430	(1)	3,850	4.00	127.75
Cambridge	91,886	540	...	...	...	(1)	3,900	3.75	100.00
Charlestown	45,000	280	42	480	...	(1)	3,850	4.25	127.75
Chelsea	34,072	220	...	480	...	(1)	4,018	4.00	100.00
Clinton	10,423	49	...	340	...	.....	3,610	4.38	104.61
Cohasset	1,700	...	2	...	...	(2)	1,950	4.00	70.00
East Blackstone	.....	...	38	...	480	(1)	3,883	4.50	146.00
East Braintree.	8,000	...	94	...	430	(1)	2,200	4.25	z
Fall River	104,863	713	...	480	...	(1)	3,950	3.90	127.75
Fitchburg	31,531	291	...	340	...	(1)	3,900	4.25	100.00
Foxboro	3,800	...	6	...	...	(2)	2,179	4.35	75.00
Franklin	5,000	42	...	340	...	(2)(3)	1,350	4.85	75.00
Gardner	9,000	69	...	340	...	(2)	1,600	4.50	75.00
Gloucester	26,121	100	20	340	480	(4)	1,550	4.25	75.00
Hingham	4,819	...	4	...	...	(3)	1,564	(7)	z 37.61
Holyoke	45,712	260	...	340	...	(1)	4,000	4.05	100.00
Hudson	5,300	...	25	...	430	(2)(4)	1,600	3.75	z
Hyde Park	11,000	135	...	480	...	(2)(3)	1,677	4.00	66.66 70.00
Lexington	3,700	39	...	340	...	(3)	1,500	5.00	75.00
Lowell	94,969	494	...	480	...	(1)	4,000	4.49	120.45
Malden	33,664	248 52	19	...	...	(1) (1)(2) (2)(3)	4,000 2,179 1,385	....	105.00 90.00 73.68

(1) All night. (2) Moon scale. (3) Midnight. (4) After midnight up to 1 or 2 A. M. The difference in time may be judged from the column showing number of hours lamps burn. (5) To 1 A. M. for 6 mos. and all night for 6 mos. (6) For 4 mos. all night; 8 mos. to 1 A. M. (7) Rent power. (8) Mill waste. z Municipal plant.

The data given in the above table were collected by the General Electric Company, Schenectady, N. Y.

(To be continued.)

NEWS AND PRACTICE AMONG THE CITIES

Sprinkling with Salt Water—Chicago May Own Street Railways—Norristown's Bitulithic Pavement Satisfactory—Health of Peoria Good—Road Repairing in Connecticut

Water Meters Prove Successful

AFTER all that has been said against the use of water meters in Columbus, O., the annual report of the Director of Public Improvements shows that their use during the past year was most successful from every standpoint. In the matter of collections for water service the money came in much more quickly. The pumpage was 350,000,000 gallons less than the previous year and there were fewer complaints made by citizens about the water supply. There has been general satisfaction with the use of meters from the standpoint of the water users. People pay for what they use and are not compelled to make good the waste of other people, and those that are careless and waste the water must pay for it. Leaks and other causes of waste will be taken care of and rectified at once by the people.

An Aid to Good Road Building

AN addition to the road law of California was passed by the last Legislature which will permit of roads being constructed even if the road funds of any county are too meagre to build them. It provides that, "Whenever it is determined by a two-thirds vote of the Board of Supervisors of any county that the public convenience and necessity demand the acquisition or construction of a road in excess of three miles in length, the cost of which will be too great to pay out of any of the road funds of the county, the Board of Supervisors may by a resolution passed by a two-thirds vote of the Board of Supervisors determine to acquire or construct such road and thereafter may proceed to acquire or construct such road, and if the cost of such road when constructed shall exceed five thousand dollars, such cost may be charged to the General County Fund, the General Road Fund or the District Fund of the district or districts benefited."

Financial Condition of Shreveport

FIGURES are often dry reading and do not appeal to many, but they tell a story that would be often difficult to relate without them. The annual report of the Comptroller of Shreveport, La., Mr. C. G. Rives, shows what the city has been doing during the last year and in what condition are her finances. The total receipts for the year amounted to $154,732.91, of which amount licenses contributed $68,594.60, and taxes $60,333.66. The expenditures were $156,904.21, which left an apparent deficit of $2,171.30. The actual deficit was greater than this, however, on account of the city's share in paving a street. The bonded indebtedness of the city amounted to $247,000 when the books were closed on January 31, but a sufficient amount of the bonds have been taken up since to reduce the total amount to $107,000. On the present rate of assessment it will take six years to pay off this amount with interest instead of nineteen years as originally intended.

New Rules for Water Consumption

NEW rules for the consumers of water in Winnipeg, Man., have been formulated by the water department of that city. In order to enable the fire, water and light committee to readjust the rates, each consumer must fill out a blank, giving the number of rooms and occupants of his house as well as other important information. Consumers will not be allowed to sell water, permit it to be carried away or used by outsiders, or to improperly waste it. Penalties of a fine of $20 or a month's imprisonment are attached to this regulation. All contractors and builders must pay in advance for all water used in construction work. The water department must have plans showing the amount of material to be used, when a permit for the quantities paid for will be issued. A severe penalty is attached to violations of this action.

Can Compel Placing of Wires Underground

GOVERNOR PENNYPACKER, of Pennsylvania, recently signed a bill permitting cities of the third class, in which is included Harrisburg, and boroughs to define by ordinance a reasonable district in which electric light wires shall be placed underground in conduits owned by either the municipality or a company organized for the purpose of laying such conduits. In all cases where such conduits are owned by private companies, or individuals, the right shall be reserved to the municipality, whether expressed or not, to regulate by ordinance the manner in which such conduits shall be used and the terms, conditions and rate of rental to be charged for space in them. The municipalities shall have the right to take such conduits either by purchase upon agreement of the owners and the municipality or by condemnation proceedings.

Salt Water for Street Sprinkling

THE Council of the city of Oakland, Cal., passed unanimously a resolution, of which the following is a copy:

Resolved:—That the Board of Public Works be and they are hereby requested to instruct the Superintendent of Streets to cause to be sprinkled with salt water, for the period of three weeks, a number of macadamized and bituminized streets in the district bounded by First, Broadway and Eighteenth Streets and Lake Merritt, and to be sprinkled with salt water, for the period of three weeks, a number of macadamized and bituminized streets in the district bounded by Broadway, First, Market and Fourteenth streets. Said salt water to be drawn from Lake Merritt, or from the estuary, at some point or points where it is not contaminated by sewerage, and to be supplied to the sprinkling carts by the use of a city fire-engine or other pump and engine.

Municipal Ownership of Street Railways

THE Legislature of Illinois has passed the Mueller bill, which was designed to permit the city of Chicago to own, operate, lease or construct street railways. The bill provides that every city in the State may acquire, maintain and lease for periods of twenty years street railways. Bonds may be issued for this purpose after approval of two-thirds of the voters at an election. They must also pass upon the question whether the city shall lease or itself operate the roads, and three-fifths vote shall be necessary on this point. Instead of bonds, cities may issue street railway certificates, which shall be a charge upon the railways and not upon the city, and may be secured by a mortgage or deed of trust. In case of default or foreclosure, the mortgagees are to come into possession of the railway for twenty years only, and be subject to such regulations as are provided in cases of original private ownership. Existing street railway franchises may be renewed for periods of not more than twenty years and be made subject to the right of the city to step in and take over the property on terms provided in the grant. New franchises are to be granted on similar conditions, but no ordinance authorizing a lease for a longer period than five years shall go into effect until the expiration of sixty days from its passage. If, meanwhile, ten per cent. of the voters casting ballots at the last election petition for the same, the ordinance must be submitted to popular vote and approved by a majority before becoming effective. Street railways operated by the city may carry passengers, baggage and mail, and can be used for other purposes as the council determines. Their accounts must be kept distinct from other municipal accounts and such charges must be made as will permit of the roads being self-supported, and will, in time, sink the debt incurred in their behalf.

Norristown's Bitulithic Pavement Satisfactory

A PARTY of officials and citizens of Scranton, Pa., recently paid a visit to Norristown to inspect the bitulithic pavement laid in that city. About two and one-half miles of this pavement has been in Norristown since last fall, and the best of satisfaction has been given by it. Director of Public Works Jayne and Chief Engineer Jifkins, of Scranton, were entirely satisfied that the pavement was an excellent one, and other members of the party were impressed with its worth. In speaking of its good qualities, Director Jayne was quoted as saying: "The most striking features of the pavement are its noiselessness, its imperviousness to water and its comparative cheapness. The noise made by vehicles in passing over it is hardly any louder than that made on a dirt road, and there is every reason to believe that it is absolutely uninjured by water. This pavement was given a severe test last week, when a three-ton truck bearing a sixteen-ton girder was drawn for several blocks by six teams of horses. Not a perceptible dent was made on the pavement."

Special Tax Laid on Poles

THE City Council of Quebec, Que., recently passed an ordinance imposing a special tax on all poles in the city's streets used by telephone or telegraph companies. In addition to all assessments on real estate, business tax and annual tax fixed and personal of $1,000 for telegraph, $1,500 for telephone, and $1,200 for electric light company, a special tax of twenty-five cents is to be levied on each pole used by these companies for the support of their wires or for other uses. The tax is to be paid yearly when other municipal taxes are paid.

Steady Growth of Meter System

SINCE the adoption of the meter system in 1897, when the Water Commissioners of Clinton, Mass., decided to attach meters to all services difficult to adjust under the flat rate, the growth of the meter system has been steady. At present 70 per cent. of the services are metered and more are added each year. Consumers have had plenty of water and have paid less for it under this system because they have been careful to eliminate waste. Less water is wasted, as shown by the Venturi meter, and the present sources of supply will be sufficient for many years to come. There were seventy-nine meters placed during 1902, making 988 meters in use. Of this number, 919 are owned by the city. During the year 166 water takers under meter schedules were notified that their meters were showing especially large readings, and in nearly all cases the department was thanked for this information, and precautions were taken at once to repair the leaks or stop the careless waste. The total consumption of water for the year was 250,109,990 gallons. The daily average use per meter was 226 1-9 gallons, and the daily per capita consumption 15.94. There was an average of 7.58 persons per service.

Peoria a Healthy City

GREAT pride is taken in the state of health of Peoria, Ill., by the Commissioner of Health, Dr. L. A. McFadden, to judge from his annual report. The death rate is given at 10.6 and the deaths from contagious diseases were very few—only 4 per cent. of the total deaths. Although 140 cases of small-pox were treated, no deaths occurred. This is a better showing than can be made by most cities. The cases of typhoid were few, and not one traceable to the water supply of the city. Those not imported came mainly from private well water which should be closed. Consumption carried off more than all the other diseases combined. Dr. McFadden recommends that great precautions be taken to prevent the spread of this disease. Rooms occupied by patients should be fumigated as soon as vacated, sputum cups should be provided and burned after use, etc. He aptly remarks that authorities would be charged with criminal negligence if they failed to take measures to prevent the spread of such diseases as small-pox and scarlet fever, yet little if any means are taken to stop the spread of tuberculosis which causes the death of more persons than all the others. He asks that a hospital be erected for consumptive persons. The department has used every means at hand to prevent disease. He asks that power be given the city to cause the removal of all weeds and vegetable matter lying on property within the city. In his opinion there is but one way to dispose of garbage, and that is by burning, and a crematory is therefore recommended. The milk and water supplies of the city are excellent, and the former is carefully watched. Public baths should be provided for those having no such facilities at home. The appointment of a female trained nurse to the regular staff is urged, as a woman could do certain things not possible by men.

How Connecticut Repairs Roads

THE work of repairing the roads throughout the State of Connecticut is in order, according to a letter to all selectmen of towns throughout the State from Hon. James H. Macdonald, State Highway Commissioner. He asks that all repairs be made as speedily as possible, as the time is favorable for the work. All culverts and gutters should be cleaned out and all shoulders on the roads should be pared down so that they shall be below the travelled portion of the highway. This will permit of the water running off into the gutter. Gravel roads should have a little gravel placed on the toe marks in the centre of the road and in the ruts. If this is not done at this season, no good will result. All loose stones should be removed from macadam roads with a back of a rake, not the teeth. Loose stones injure a road as much as any one thing, because they are driven into the surface and break the bond. Where the stone is beginning to show through, a little splinters or chips of stone should be applied to form a cushion. This cushion should not be more than three-fourths of an inch thick. No sprinkling or rolling is necessary. A ton of splinters will suffice for from 250 to 300 square feet. An ordinary farm roller, weighted down, and run over the road after loose stones are removed will improve it. It is not necessary to use screenings on a stone road, as they only furnish dust in dry weather. If the road is watched, a new surface will not be necessary, as it will not have the chance to get in bad condition. He congratulates the selectmen on the fact that the roads have been so well looked after by them in accordance with the means at their disposal, and this fact will greatly aid in securing to the towns the State aid they at present enjoy.

Health Conditions in Washington

THE report of the Health Officer of Washington, D. C., Dr. William C. Woodward, was prepared in the usually exhaustive style of reports from the District of Columbia. It shows that the death rate for 1902 was 16.43 for white and 30.37 for colored persons. Comparing the death rates by sex and color, they arrange themselves in a descending scale thus: colored males, colored females, white males and white females. The death rate for the earlier years of life will account for much of the total, that for the colored race under one year and under five years being "appalling." The rate for under one year for whites is 165.1 and for colored 444.6, while for children under five years the rate for whites is 44.7 and for colored 123.2. The Health Officer goes into the statistics, showing the death rates for different diseases, in all of which the colored race has a large proportion.

Dr. Woodward states that the recommendation that marriage licenses be issued to ministers designated by name instead of to any minister, as asked several times by the department, has been incorporated in the new code of laws. The department distributed a general circular relative to the prevention of the spread of consumption. The department suggests to each physician certifying to a death from consumption the advisability of disinfecting the apartments in which the death occurred. The department will do the work if requested. In place of roping off sections of streets in which persons are seriously ill for the prevention of noise, the department has placed placards requesting persons to make as little noise as possible. The results were fairly satisfactory, and were free from liability of abuse, as was the case with the old method. The efforts to reduce the smoke evil resulted in greatly diminished quantity of black smoke emitted into the atmosphere. The filtration of Potomac water will reduce the mortality from typhoid. A medical inspection of schools should be instituted, municipal baths should be provided for the poorer classes, and when the swamps about the city are reclaimed, the health of the city will be greatly improved.

CRIME: ITS CAUSE AND REMEDY

Why Youth and First Offenders Should Be Kept from Criminals—Classes of Criminals—Views of Police Chiefs on the Subject

BESIDES the usual data concerning the detailed operations of the department, the report of Chief of Police W. W. McDowell, of Youngstown, O., contains some views on the theory of crime, its cause and remedy that we feel will be read with interest by other chiefs of police throughout the country. In recommending that a new police station be erected because of the unsanitary condition of the old one he is led to say: "I desire, however, to call your attention to another view of the matter. I consider it my duty as a public official, having a knowledge of the facts, to call your attention to the continued contamination of the youth of our city by witnessing, hearing and associating with the hardened criminals and degenerates confined at times in the lock-up.

YOUTH SHOULD BE PROTECTED FROM CONTAMINATION

"One of the objects of imprisonment is the reformation of those capable of being reformed and the isolation of those confirmed in crime. We have built costly institutions for the reformation of our youth who seem criminally inclined. Before being sent to these great institutions the youth is arrested and held for days in places like our lock-up where he must, of necessity, be thrown into intimate and close association and conversation with the other and older prisoners. He listens to the story of the hobo, the thief, the drunkard and the circumstances of criminality that is gathered there. The stories are told in the most alluring way and by those who have participated in their happenings. He hears and remembers. He goes to the reformatory knowing more of crime and wickedness than he ever dreamed of before being arrested. The knowledge remains with him until a time comes when he has a chance to try for himself some of the things he has heard. The same is true of any wayward youth arrested for any trivial offense. I can name many young men, now regarded as criminals, who got their start in that way. I have heard it from their own lips and it has come under my personal observation. Young girls, wayward, perhaps, but not naturally bad, sometimes are locked up for minor offenses. They are of necessity thrown into close association with the most depraved of their sex (if such happen to be under arrest at the time) and the exchange of ideas that result are certainly not calculated to teach the lessons of virtue and morality. They generally portray the allurements of vice.

"It is a duty we owe to the future of our country that we protect our youth from contamination. It is not wise to stand idly by while a race of criminals are being taught in order that we may arrest them when they are grown up. There will always be enough to arrest even when human ingenuity is taxed to its utmost to prevent their increase.

HOW CRIMINALS ARE DIVIDED

"When a great crime is committed society is shocked and stunned. The details of cunning, cruelty and wickedness appal it. When it recovers it commences to consider and asks 'What is the remedy?' The answer is for the police departments. To them it is a matter of thought and study. They consider first: The criminal; second, the cause; and last, the remedy.

"Criminals are of as many different kinds as there are different natures among those who commit crime. John Kiffmeyer, superintendent of the Bertillon bureau of identification in Cincinnati, divides criminals into four great classes, viz.: The Criminal of Passion, of Instinct, of Occasion and by Profession. I would describe these classes as follows:

"The criminal of passion is the most difficult to anticipate or prevent. His crime is either conceived and executed suddenly and while in a whirl of passion or is the result of well premeditated cunning. He is generally sensitive by nature, with high passions. He may have the self-control to wait and plot and consider or he may be devoid of self-control and act spontaneously. In either case he is the same and the cause is passion.

"The criminal of instinct is the most dangerous though the most easily detected. He carries his nature on his face. Crime to him is a pleasure and natural. He is never worried with regrets or remorse. To him reformation is hardly possible.

"The crinimal of occasion is a common type. He is generally deficient in energy and resistance and drifts into crime unconsciously. Failing to stand as he would in the battle of life he attributes it to luck and imagines he is compelled to steal. He easily drifts into the professional class.

"The professional criminal is fairly intelligent, a thinker and able to adapt himself to all circumstances. He approaches his crime deliberately and with definite intent. There is no sentiment in his crimes. They are a part of his business. Whatever progress there has been in crime is due to this class.

"These different classifications approach each other so closely that the line of demarcation is not easily distinguished. But while approaching each other they seldom combine to any great extent. It is estimated that there are 300,000 professional thieves in the United States. We have 500,000 paroled convicts. There are 98,000 in our penal institutions and 46,000 in reformatories. This makes 1,000,000 people who come under the observation of the police. The ratio is about one to eighty of the population.

CAUSES LEADING TO CRIME

"The causes that lead to crime are almost as various as the crimes. The fundamental cause lies in the early training, associations and education. This is true even in the crimes of passion. The character is moulded in youth. Natural tendencies may be restrained, if not eliminated, by early and proper training and care. Association or contact with criminals should be avoided. A dormant strain of criminality is often roused into being by the well told story of some thief. Youth is imitative and strives to emulate the elders. A lack of education is often an incentive to crime. Crime decreases as education increases and is rare among great brain workers. A desire to live beyond one's means, poverty, jealousy, hatred, cards, women and wine make many criminals. Every desire, every passion, every inclination and every misfortune of humanity has made its criminals.

THE REMEDY FOR CRIME

"The remedy for crime is not easy to find. A more careful rearing of the young would do much for the future. To the police officer, however, the remedy lies in the means provided by the law. His duty is to prevent and detect. He has not control of all the means of prevention but there are some that he can command. The best way to do it is to study the ways of criminals and keep track of them. He must constantly be on the alert and study their habits, associates and characteristics. He must learn to detect them when he meets them. Their haunts must be watched and noted. Known thieves must not be permitted to reside in the city. Those who harbor them must be crushed ruthlessly. A police officer has a duty even before a crime has been committed.

"The detection is the duty that comes after the crime is committed. Police work is a profession and requires ability, hard and constant study and application to ensure success. The officer who desires to make for himself a name in his chosen work must devote to it his best efforts and thoughts. He must be ever watchful of all those with whom he comes in contact. He must be a close student of humanity and human nature. He must classify humanity and find its characteristics. Like inclinations and pursuits produce like characteristics. Of this truism the student of criminology will find full corroboration. Thieves have much in common. Most strikink is their language, which is peculiar to them and unintelligible to those not initiated. It is not of words specially coined but of words misapplied and of hidden meaning. Officers must study this ever changing 'slang' that it

may be detected and understood at any time or place. The record of crimes and criminals must be studied—not so much to find how crimes will be committed as to know how they have been committed. Crime is ever changing, ever progressing. Every day brings forth new methods, new ways, new systems. Every crime is a study for that officer who desires to succeed.

Crime Harder to Detect as Cities Grow

"As a city grows and increases the police find increased difficulties due to there being a better chance to conceal crime and a greater field for criminals. Crime changes as the city changes. The officer must keep pace with the changes or fail in his duty. The pickpocket thrives in cities or crowds. They generally travel and operate in gangs of from three to five. They do their work in many different ways and are difficult to capture. Stolen articles are rarely found on the one who stole them. Their 'system' prevents that. During the past year this department arrested and convicted eight well known professional pick-pockets.

"Porch climbers generally work far from their haunts and rarely twice in the same neighborhood. Unless caught in the act or with stolen property that can be identified on their persons they are hard to convict, as the victim can seldon identify them. Professionals rarely steal things that can be identified.. Money or jewelry whose marks cannot easily be removed are left behind. The novice takes everything. This class work while the family is at supper or engaged down stairs and effect an entrance through an upper window, preferably one over a porch. The porch climber was unknown only a few years ago.

"Forgers, particularly the greater ones, are growing less. The small forger is generally a rover and works in many communities. The principal way is to forge a small check and pass it. Tradesmen are generally the victims.

"Bank burglars rarely work where there is an organized police force. Modern banks take too long to open and are too well guarded. Their work is generally in remote and small towns. Safe blowers of twenty years ago were well dressed and gentlemanly and carried tools that often cost $1,000. They traveled on passenger trains, put up at good hotels and spent money freely. Safe blowers of to-day are entirely different persons. They travel on freight trains and in the guise of hobos or workmen looking for work, in the latter case carrying some kind of a 'working card.' Their tools are a bottle of nitroglycerine, or 'soup,' as it is called, fuse, caps and a bar of soap. Other tools as required are obtained from blacksmith or machine shops. Fully one-half of the safes that are 'cracked' do not have to be blown. A punch or a drag or a sledge will do when skillfully used. Before the job is attempted the line of retreat is arranged, the time of passing freight trains is noted and the shot fired as one is passing. Two-thirds of the safes blown are within 1,000 feet of a railroad. Within an hour from the time the shot is fired the criminal is out of the city and lost among the shifting hobos. Fifteen years ago the only way to escape was by passenger trains and the depots were all that had to be watched. Now when it is desired to prevent the escape of a thief from the city every railroad yard, street car line, road, livery stable, depot and field must be watched. There were six burglars arrested in this city last year.

What Other Chiefs Say

The views expressed by Chief McDowell in his report have received the endorsement of many of the prominent chiefs of police in the country. A letter was sent to many such chiefs containing the following questions, to which these answers were received: "Should the young of both sexes be locked up with older criminals where they can communicate with one another?" The answers were invariably "no." "Should the sexes be kept apart?" The answer was "yes" and in some cases "emphatically yes." "Should the first offenders and those arrested for trivial offences be kept away from old offenders and those up on more serious charges?" In the majority of cases the answer was "yes," but Chief George A. Taffe, of Indianapolis, wrote: "I believe all criminals should be put together regardless of offence or degree of offence." Superintendent J. C. Whitaker, of Dayton, O., and others consider that they should be kept apart "by all means." Regarding the classification of criminals as made by Chief McDowell, which was the fourth question, the answers were in the main an endorsement of Chief McDowell's views. Chief Hayes, of Kansas City, Mo., divided criminals according to ages, viz.: ten to sixteen, seventeen to twenty-one, twenty-five and over." He also stated that the "whipping post is the best for all first offenders." Assistant City Marshal John Fleet, of Fall River, R. I., is of the opinion that criminals of "instinct" are the most dangerous, although most easy to control if they could be led to use their reasoning powers.

Superintendent Whitaker, speaking further on the fourth question, said: "Criminals of passion, of instinct, of occasion and profession should never be permitted to associate with each other in prison. My experience with criminals has taught me that those of instinct are without doubt the most dangerous and more easily controlled than others because of the fact that they naturally are cowardly and inclined to reveal their own acts more than those of passion, occasion or profession. The professional criminal has become so by study and practice, he having framed his mind thoroughly relative to what he will say when arrested, and the result is that he says nothing, leaving the officer to arrive at his own conclusion. The criminal of passion is one whose acts are directed by passion and does not so frequently commit a crime, etc."

Chief George W. Wittman, of San Francisco, wrote: "I would certainly divide the criminals so that the different classes may be kept by themselves. For instance, those who commit crime in the heat of passion should be segregated from those who are criminals by instinct, and they from those who are criminals by profession as well as those who take advantage of opportunity to commit crime. By the latter I mean: If a young bookkeeper or cashier on the impulse of the moment commits an embezzlement and is caught at it, the fact of his arrest and the offence being made public would deter him from committing any such crime in the future, and he should be kept from the latter and professional criminals, who would, perhaps, to use a street expression, 'brace him up.'"

Chief McDowell places the police remedy for crime in prevention and detection, i. e., by studying the ways of criminals and keeping track of their actions. These views were endorsed fully and, in several cases amplified. We quote two. Superintendent Whitaker, of Dayton, wrote: "It is important that an officer should continually study the ways of criminals, and it requires constant study, for each class as above named have their own mode of working, and even at that they vary from their own rules and apply rules to suit the conditions, consequently it is almost impossible for one officer to advise how to proceed in the apprehension and capture of the violators of the law." Chief Wittman, of San Francisco, said: "I believe in the prevention and detection of crime as being the best means for subduing criminals, i. e., to study their ways and direct their doings until we are able to get them in prison on a charge which would result in their conviction and imprisonment for a term fitting the enormity of the offence."

MEETING OF INTERNATIONAL POLICE CHIEFS

THE members of the International Association of Police Chiefs who attended the annual convention held in New Orleans the 12th to 16th of last month, will always remember it, if all are of the same sentiment as their president. The hospitality and kindness of the citizens in their welcome, according to President Sylvester, made the trip "one of the pleasantest remembrances of my life."

The convention was opened by Superintendent John Journee, of New Orleans police force, and after prayer had been offered, Mayor Capdevielle welcomed the visitors in the name of the city. Superintendent Journee also extended his welcome, as did Hon. P. A. Capdau, Chairman of the board of police commissioners. The rest of this session was given over to the president's address. In the course of his remarks he said: "There is no doubt that the child which discloses evil traits, viciousness, and destructiveness, if allowed to continue along such lines, without discouragement and education to the contrary, will develop the same qualities in a more emphatic and disastrous form as it grows older, and it is just as true that criminals are created through neglect and by improper surroundings and associations." The formation of the association was the desire to elevate the police officer in the esteem of the people. He urged the importance of legislation looking toward a laboratory for the study of crime and the furthering of the work of the national bureau of identification for criminals. A fugitive law would be of benefit to all States. He urged that an exhibit of police be made at the coming Louisiana Exposition, as requested by the authorities there. A trolley ride was taken about the city, and the members had the opportunity to see New Orleans.

The morning session of the second day was devoted to interesting papers, and a number of letters from foreign police chiefs were read. Chief Benjamin Murphy, of Jersey City, N. J., sent a paper, which was read by President Sylvester. It was entitled "The Police and Its Origin; What It Has Been and What It Should Be, as We Understand the Police Service." Chief Murphy told how a force should be appointed and made efficient. In his opinion, one hundred policemen, properly handled, should be able to take care of 2,000 rioters. He stated that no policeman could be successful who has not the friendship of the good people of his community. Chief J. W. Ball, of Atlanta, Ga., spoke on "The Suppression of Crime and the Preservation of Peace." He told of the work in his city to uplift the poor and unfortunate, special officers being detailed for this work. It was done as a preventive of crime. Chief John J. Downey, of Detroit, Mich., read a paper on "Gambling, the Vice of the Indolent," in which he said that a gambler is always a thief, often a crook and sometimes a murderer. Gambling is the root of all crime. He urged a better co-operation between police and the judiciary.

"The Negro in Crime" was the subject of a paper by William D. Vinzant, chief of Jacksonville, Fla. He claimed that 95 per cent. of the criminal classes in the South were negroes. Chief Francis O'Neill, of Chicago, read a paper on "What Science Has Done for the Police." "The Juvenile Court" was contributed by Captain William Desmond, chief of detectives of St. Louis. He said that there was a streak of evil in every one which, if exposed to "infectious circumstances," is liable to break out, but if watched and taken in hand can be overcome. The law should go farther than to wait for crime to be committed by the young. When no proper discipline prevails and evil examples are set before the young, the State should step in. "The Origin and Growth of the Railway Police" was read by Charles E. Burr, special agent of the B. & O. Railroad. He said that, if the local police would act in conjunction with the railroad police, they would both be benefited. In the afternoon the visitors were given a ride on the river and in the evening the Elks entertained them at a social.

On the morning of the last day the first on the program was a paper by Chief Seth Gunther, of Louisville, Ky., on "The Treatment of Juvenile Offenders and Confirmed Criminals by the Officers of the Law." He said that there should be a rigid system of police supervision over every released convict. The reformed criminal ought not to be put on an equal footing with honest society. Action was then taken on the death of several members, which occurred during the year. An interesting discussion took place in regard to the national identification bureau and its work. A committee of three was appointed to consider the adoption of the finger-print system. The committee consists of Superintendent Edward A. Evans, of the National Bureau of Criminal Identification; W. A. Pinkerton, Chicago; and W. G. Baldwin, of Roanoke, Va. The old officers of the association were unanimously re-elected, and are as follows: President, Richard Sylvester, of Washington; vice-president, Frank J. Cassada, of Elmira, N. Y.; secretary-treasurer, Harvey O. Carr, of Grand Rapids, Mich. St. Louis was selected as the next place of meeting. Before the session closed, a paper from John J. Foster, Chief of Camden, N. J., was received and read by the president. It dealt with "First Offenders." In the case of a mischievous boy, a sound spanking by the parents in the presence of the police would be better for the boy and the community than imprisonment. A refusal on the part of the parents should be followed with a money fine. He does not believe that imprisonment is reformatory. A police matron is necessary to deal with young girls and women first offenders, and they should be appointed everywhere. A banquet at the West End, tendered by the city officials, wound up the convention's enjoyments.

Data of Police Departments of Fourteen Leading United States Cities*

	Estimated Population, 1902.	No. of Policemen.	Private Police.	Total Estimate, 1902.	Annual Salaries Paid. Superintendent.	Asst. Superintend't.	Captains.	Lieutenants.	Sergeants.	Patrolmen. First Year.	Patrolmen. After 3 Years.	Chief of Detectives.	Detectives.	Commissioner.	No. of Precincts.	No. of Stations.	Territory Covered, Square Miles.	No. Patrol Wagons.	No. of Horses.	No. Officers on Court Duty.
Boston	600,000	1,181	295	$1,707,344	$4,000	$3,000	$2,500	$1,600	$1,400	$1,000	$1,200	$2,800	$1,600	3 @ $4,000	16	23	36	18	91	..
Buffalo ...	400,000	732	....	797,590	3,500	2,500	1,400	Insp's 1,400	1,020	720	900	2,500	1,000 and 1,200	2 @ 2,500 and Mayor 500	13	13	42	7	83	2
Cincinnati .	326,000	530	100	577,314	5,000	1,800	1,800	1,500	1,200	850	1,050	2,000	1,500	4 @ 1,500	10	10	35¼	10	56	9
Chicago ...	2,000,000	3,250	500	3,437,600	6,000	3,600	2,250	1,500	1,200	1,000	1,000	....	1,200	3 @ 3,000	42	42	194	47	250	12
Cleveland ..	400,000	361	400	500,000	3,500	2,000	1,500	1,200	1,100	1,000	1,000	1,500	1,200	2 @ 2,500	13	13	34	5	38	4
Detroit	376,437	525	25	553,300	4,000	....	1,500	1,100	1,000	800	900	2,000	1,000 and 1,200	5,000	8	13	29	7	65	12
Louisville ..	235,000	329	47	280,109	2,500	1,500	1,300	1,000	900	820	820	1,500	900	3 @ 2,500	7	6	22	6	35	...
Milwaukee .	310,000	314	50	350,000	4,000	....	2,100	1,400	1,200	840	960	2,500	1,400	4 @	3	5	22	3	12	...
New York..	3,682,159	7,555	1,081	11,566,680	8 @ 3,500 4 @ 5,000	Inspr's	2,750	2,000	1,500	800	1,400	2,750	1,400 to 2,000	1 @ 7,500	81	93	327	71	416	163
Philadelphia	1,500,000	2,980	800 and 900	3,565,522	4,500	....	2,100	1,700	1,100 and 1,300	650	1,000	2,200	1,200 and 1,450	None	34	44	129	32	300	...
St. Louis ..	650,000	1,381	350	1,574,140	5,000	2,000	2,400	1,500	1,380	1,080	1,080	3,500	1,380	4 @ 1,000	12	22	62	14	130	4
Rochester ..	175,000	200	....	.....	2,400	....	1,800	1,200	1,020	900	900	2,200	1,200	1 @ 3,600	5	5	...	2	6	3
San F'ncisco	420,000	638	82	859,444	4,000	....	2,400	1,680	1,500	1,224	1,224	3,000	1,800	4 @ 1,200	5	11	42	8	58	9
Washington	278,718	665	29	743,565	3,300	....	1,500	1,320	1,140	900	1,080	1,800	1,320	3 @ 5,000	10	11	70	11	36	5

* Compiled January 1, 1903.

Cost of English Police Forces

A CONFERENCE between the Lord Mayor of Dublin and a deputation of authorities in the Dublin Metropolitan area and the Chief Secretary for the government called forth some interesting information relative to the cost of maintaining the police forces in Dublin and English cities.

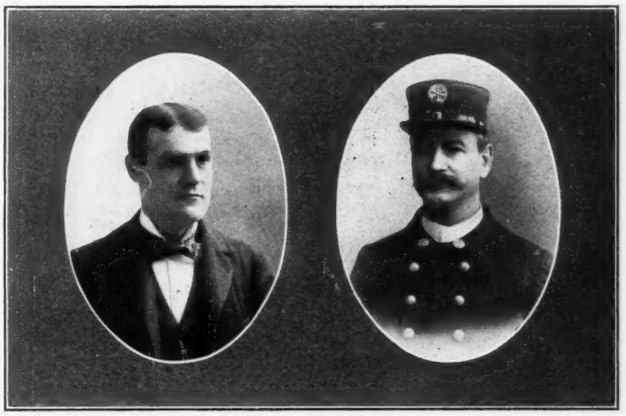
During the first portion of the late Queen Victoria's reign the tax rate for the support of the Dublin police was placed at 8 pence in the pound. The revenue from this tax at that time amounted to £21,179. At the present time this revenue amounts to £41,002 plus 5 per cent. for collection. The property valuation had practically doubled since 1852, some years after the levying of the rate, but the tax was the same. In 1852 the number of police amounted to 1,109, and in 1902 there were only 1,154, an increase of but 45, while the cost had doubled. In 1863 the number of indictable offences was 9,520 and in 1902 but 2,696. In 1863 the summary offences totaled 43,694, but in 1902 they were only 29,736. Thus crime had diminished to about one-half in these years.

The English police perform certain duties not done by those in Dublin. Thus they report neglected paths, sanitary arrangements out of order, etc., to the Council. They also do a considerable amount of fire-brigade work. Compared with Sheffield, the area of that city is larger than that patrolled by Dublin police, yet only 515 officers are employed and some act as members of the fire-brigade. The cost of the Dublin police in 1902 was £166,000. As compared with Glasgow, that city had 1,379 policemen, but did the work for £136,000 a year. The citizens contributed only £25,545 a year towards their maintenance, and they also acted as a fire brigade, while Dublinites spent £41,002 on the police and £4,500 on a fire-brigade. It takes only 572 men to patrol the city of Leeds, although the population is 428,968, as compared with 390,187 for Dublin, and the city spends £27,836. In Sheffield the police tax rate was 4½ pence in the pound; in Bradford, 3.63 pence; in Glasgow, 3 9/16 pence on rents of £10 and over and 1 25/32 pence on rents under £10; in Manchester, 5 pence; in Liverpool, 5½ pence, with a large rebate for police employed on the docks, sixty-one men served in the fire-brigade and 300 constables trained in the use of fire-appliances; in Bristol, 5⅛ pence; in Nottingham, 4⅜ pence; in Bolton, 2.93 pence; in Huddersfield, 4.62 pence; in Leeds, 3.84 pence; in Hull, 4.293 pence; and in Birmingham, 4 pence. In Belfast, Ireland, a city slightly larger than Dublin, the number of officers was 937, of which number the Government gave 500 free, and the tax was 3.43 pence in the pound.

The foregoing figures were submitted by the Lord Mayor in his endeavor to prevail upon the Secretary to petition the Government Treasury for a reduction in the rate of police tax. In reply the Secretary pointed out that in order to make just comparison, a deduction from the police rate should be made in the matter of the keep-up of the police courts, etc., and this would reduce the cost per inhabitant in Dublin from 8s. 2d. in the pound to 6s. 6d. Comparing the cost of the policeman in Dublin and London, in the former he costs £109 7s. 3d., and in the latter £136 7s. 5d. Notwithstanding this, however, he considered the rate very high. The Treasury, according to law, should pay but one-half the cost of the police, but statistics showed that in 1852 the Treasury defrayed 46 per cent.; in 1872, 50 per cent.; in 1892, 70 per cent. Consequently, the Secretary was uncertain what further relief would be granted the citizens by the Treasury, inasmuch as it was paying much more than the law prescribed.

Milwaukee's New Fire Alarm System

A NEW and modern fire alarm system is being installed in the city of Milwaukee, Wis. The old system has been in use for years and a new one has been found necessary. The new will be a central office system located in the City Hall tower on the seventh floor. The operating room will be forty-two feet square and have an abundance of light.

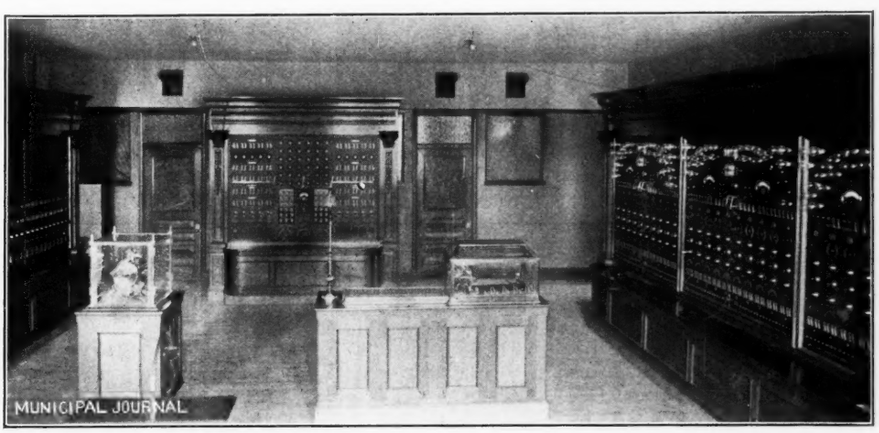


O. D. KLEINSTEUBER, Sup't Fire Alarm. HERMAN MENINGER, Chief Fire Department.

In planning this new system, the future growth of the city was considered and arrangements were made so that extensions could be readily secured without disarranging the general plan. It will have a capacity sufficient to operate thirty signal box circuits, ten independent gong circuits and four independent "joker" circuits. These will assure the security and reliability of the service and the practical certainty of transmitting an alarm of fire without failure. The latest type of storage battery will supply the power for operation and the switchboards will be provided with automatic devices which will fully protect the whole system from possibility of damage from high power dynamo currents. All the circuits will have up-to-date arrangements for protection, so that the entire equipment will be safe from harm. All the line circuits will be tested at frequent intervals by an automatic testing device which will indicate at once any break in a circuit.

When an alarm of fire is received at the central station it will immediately pass out over the "joker" line to all fire houses in the city and a duplicate of the box number will be transmitted over independent gong circuits by the latest manual transmitter, which will send out any number from one to 9,999.

Slate bases will be used for all equipment; they will be well insulated and the bases will be mounted on hardwood pedestals with French glass cases to keep out dust and moisture.



CENTRAL STATION OF MILWAUKEE'S FIRE ALARM SYSTEM

The whole system will be in working order by the first day of July if the Gamewell Fire Alarm Company, the makers, have not miscalculated, and when it is finished Milwaukee will be in possession of as fine and complete a fire alarm telegraph as has been furnished any city. A number of new Gamewell alarm boxes are now being placed on ornamental pedestals.

WHAT POLICE AND FIREMEN ARE DOING

London Fire Exhibition Opened—No Two-Platoon for New York—England Needs American Apparatus—Pensions for New Jersey Firemen—A New Fire Extinguisher

Salaries of Kansas City Firemen Raised

THE ordinance to increase the salaries of the members of the fire department of Kansas City, Mo., was signed by the Mayor. It makes no change in the salaries of the chief or assistant chiefs, but the pay of the foreman and private is raised on an average of $4 a month per man. The pay of the men will now be: Foremen, $1,080 per year; engineers, $1,080; drivers, hosemen, tillermen, laddermen and supply wagon employees, $960; watch boys, $420; probationers, $2 a day. The ordinance to replace the watch boys with men has been under consideration by the council and has met with great opposition.

New Fire Extinguisher

A NEW preparation for extinguishing fires has been exhibited at Munich, and the results were successful. This is a liquid of a milky color. When the skin is painted with it, it becomes insensible to heat. Rags that have been saturated with petroleum can be burned upon the hand after it has been coated with the liquid. Small fires can be extinguished with the hands when so treated and a pailful of the liquid thrown upon a burning pit of tar was extinguished at once. After being put out with the liquid, the tar could not be ignited even when petroleum was poured upon it, as the liquid had formed a film that was unmeltable and that completely shut out the oxygen. A pile of wood, several yards square, was, in another test, set on fire and, when in full blast, completely extinguished in twelve seconds with about twelve gallons of this liquid. The liquid was sold at about 75 cents a quart.

A Much-Worked Marshal

To prove that the office of village marshal in Upper Sandusky, O., is not a sinecure a recital of some of the duties of the incumbent will be sufficient. In the first place, he is to be mindful of all the Ohio laws relating to the duties of marshal. Then he is to keep the street and alley crossings free from snow and ice. After that is done, he must aid in removing the dirt and rubbish from the streets. Should these duties not occupy all of his time, the Council will assign others, that their marshal, through idleness, may not fall into evil ways.

Orange Needs More Apparatus

INSUFFICIENCY of apparatus and force handicap Chief James W. Hodgkinson, of the Orange, N. J., fire department, in his work. He desired the Council to purchase a combination chemical engine and hose wagon, to be equipped with ladders and all necessary implements. More men were also asked and the attention of the Council was called to the condition of the fire alarm. These wires in the business sections are underground, and the trolley currents have destroyed the lead sheaths, causing leaks that make uncertain the action of the system. There were eighty-nine alarms during the year, including four false alarms. The total loss amounted to $359,450, on which there was $611,530 insurance. The heavy loss is accounted for by the fire at a large hat factory, where a loss of $352,000 was sustained.

Review of Syracuse Department of Public Safety

THE annual inspection of the bureaus of police and fire of Syracuse, N. Y., was held the latter part of May. The members of the two departments marched through the streets of the city headed by Acting Chief Thos. W. Quigley, who led the first battalion, and by Chief John P. Quigley, of the fire department, who marched at the head of his men. Mayor Kline proposes to make this review an annual one. Numerous police and fire officials from neighboring cities reviewed the men and congratulated Commissioner Listman on the showing of his command. Medals for bravery were presented to those men who had distinguished themselves during the year. After the review a banquet was held and a number of speeches made by prominent men.

Unique Way to Lay Wires Underground

A WAY to lay wires and small pipes under paved streets has been found by Chief Harding, of Bay City, Mich. It was necessary to cross a certain street in that city to connect the wires to complete the fire alarm service in the district where it is underground. To dig up the pavement would cost considerable, and at the time might run the risk of ruining the paving, as it is almost impossible to repair a hole in a pavement and have it as good as when first laid. The Chief had a sharp point filed on a piece of three-inch iron gas pipe, to which was fastened five feet of two-inch pipe. Starting in a trench on one side of the street, a powerful jack forced the pipe into the earth. Inch by inch the pipe was forced across the street and came out within a few inches of the place desired. It took about five hours to cross the street, which was of usual width.

Fire Department Supervises Electrical Work

ONE of the best reports ever made of fire department conditions in Memphis, Tenn., has been given to the city by Chief William F. Carroll. There are ninety-two men in the department, and it is hoped that eighteen more will be added this coming summer. During the year 1902 the loss by fire amounted to $411,206.27. The cost of maintaining the department for the year was $103,427.54 and $18,161.90 was spent on improvements. The estimated cost of maintenance for 1903 was placed at $127,200, but the improvements to be added will bring the entire cost up to the appropriation, which was placed at $140,000. One of the improvements last year consisted of a La France steam fire engine. The department has charge of the electrical installations and inspection of wires. Permits must be obtained from the department before electrical work can be carried on, and all work of this kind must pass inspection before the department will give its approval.

Opening of London Fire Exhibition

THE opening of the International Fire Exhibition at Earl's Court, London, on May 6, was made under auspicious circumstances, as the weather was clear and the arrangements carefully made. The Duke of Cambridge formally declared the exhibition opened, and then made an inspection of the exhibits with the officials promoting the exhibition. At a luncheon that followed toasts were made by the Duke of Cambridge; the Duke of Marlborough, president of the National Fire Brigades Union; Edwin O. Sachs, chairman of the British Fire Prevention Committee; Count Kamarowski, president of the International Fire Brigades Council, Russia; Chief Officer Westphalen, vice-president of the International Fire Brigades Council, Hamburg. At a dinner given in the evening, a number of fire chiefs spoke, including Chiefs Dittmann, of Bremen; Giersburg, of Berlin; Welsch, of Ghent; and Portage, of Edinburgh. All spoke of the work of fire prevention and of the necessity of that work and fire extinguishment going hand in hand.

Police and Firemen to Keep Pittsburg Clean

A SCHEME to convert the city of Pittsburg, Pa., into one of the cleanest of American municipalities has been evolved by Director of Public Works Bigelow and has been endorsed by Mayor Hayes. The police department will do most of the work, but the depart-

ments of health, fire, highways and sewers will assist. Every policeman is to be held responsible for the sanitary condition of the district to which he is assigned. All complaints are to be made to him, and he must report daily to the nearest station house all complaints and observations made to or by him during the day. Officers are to report patrolmen for neglect of this duty, and his discharge will take place should these reports come too frequently. The Bureau of Health will ultimately receive the complaints and will remedy them. At present it has not the facilities for inspecting the city as thoroughly as can the police. The fire department will be required to flush the streets and alleys in the vicinity of the engine houses. This is to be done under the direction of the highway department.

No Two-Platoon for New York Firemen

THE two-platoon bill for firemen which was passed by the last Legislature of New York State, and which many of the firemen of New York City desired to have put in force, was vetoed by Mayor Low for many good reasons. He considered that it was not a good bill, for it was mandatory instead of permissive, that it did not include within its scope the officers of the department and that, according to the Commissioner and the chief officers of the department, it would prove contrary to the best interests of the force. Speaking of the two-platoon bill for Buffalo, which was signed by Mayor Knight, Mayor Low said that it was a permissive one and on that account considers that it was an affront to New York to attempt to coerce the officials of the city while those of Buffalo were allowed to use their discretion.

A driver in the New York department has been endeavoring to have the eight-hour working day question passed upon by the Court of Appeals of the State. He sought a peremptory writ of mandamus to compel the fire commissioner to limit his working hours, claiming that he has to work twenty-one hours out of the twenty-four in violation of the law limiting the hours of city employees to eight. It was objected on the part of the Commissioner that the law did not apply to firemen, that they had long periods of rest and that special pensions and other privileges were granted them. In both of the lower courts the driver lost his case.

American Apparatus Needed in England

As a result of his visit to the United States last September, Chief William Ely, of the fire-brigade of Leicester, Eng., made a report to the Council of that city showing just what he saw and including some recommendations for improvements to his own department. He said that the main object of the department was to get to fires even quicker than horses could draw the apparatus, and the adoption of the automobile was needed to accomplish this result. The department should have in service a chemical engine, such as Chief Ely saw in America, and he stated that at least 80 per cent. of the fires in the city could be extinguished by the use of such machines. Therefore, he recommended that a motor wagon be secured and fitted with a chemical tank to hold fifty gallons, and that would be capable of carrying four men and driver, the seats to be made into pockets, a few lengths of hose, standpipe, etc., and a scaling ladder. This combination would be very useful and one or two horses could be dispensed with, a fact that would soon save the cost of the machine. The Chief also recommended the adoption of the swinging harness in use in the United States and in some English cities. Attachments should be made to the suction inlets of engines, so that the water could be taken directly from the hydrants instead of running into the cisterns as at present. A lot of time could be saved thus in getting the engines to work, and a large amount of water could be saved that at present runs to waste owing to the overflow of the cisterns. A small quantity of rubber hose should be adopted for use in entering and passing through private premises, as much loss from water could be saved by this means.

Keyless Alarm Boxes for Albany

THE trouble caused by key fire alarm boxes, where the key is placed for safe keeping in remote places from the box, has been felt in Albany, and Superintendent of Fire Alarm James J. Gillespie is anxious to have matters remedied by installing keyless boxes throughout the city. At night it is often difficult to secure a key, and much time is lost before an alarm can be rung in. As the first five minutes after the start of a fire usually determines its extent, it is absolutely necessary that the firemen should receive notice at once, so as to be able to check the spread of any blaze. By the time a pedestrian can wake up the people in a house where a key is kept and turn in an alarm, more than five minutes have often elapsed. All alarm boxes should be so arranged that an alarm can be sent in at once. The danger of false alarms is not sufficiently great to compel delay such as is caused by boxes with keys.

Wants Piers Equipped with Sprinklers

THE work of the Hoboken, N. J., fire department was outlined in the report of Chief Applegate to the Council. A total loss of $25,791.19 was sustained from fire during the past year, four-fifths of which was insured. Chief Applegate made a number of recommendations for the improvement of the department and fire risks in the city. He commends the ordinance ordering store-keepers to remove sign posts and awnings, as the latter greatly hinder the firemen. He condemns the amount of wires strung on poles through the streets as affording a great impediment to the men, and he asks that the Council compel all companies to place these underground in the business sections. He commends the appointment of lieutenants, as the men will take a greater interest in their duties in the hope of being advanced, and so the service will be benefited. The experience the department has had with river-front fires moves the Chief to ask for better fire protection for the piers than they have at present by equipping them with modern appliances, such as the dry pipe system, which provides that lines of iron pipes be strung along under the roofs and perforated so that when water is turned on it will aid in extinguishing any fire on the dock.

Capital City's Big Engines

SOME interesting tests were made recently in Washington, D. C., to show the power of the three new engines purchased last winter and also to determine how efficient was the supply of water for fire purposes. Unfortunately, the water supply does not seem to be as abundant as is needed to serve the fire department at a large fire. Senior Assistant Chief Engineer Belt is quoted as saying that "if the three extra first-class engines recently put in service were put to work on a fire at the same time there would not be enough water in the mains to allow of their full capacity." At the tests referred to above, these in front of the Capitol were made by using the large reservoir that extends under a large portion of the plaza. There are two other large cisterns on Pennsylvania avenue northwest. They are located under the street surface, but are not kept filled. Direct connection is had in each with a six-inch main. If there should be a large fire in this section, the cistern would be filled and an engine would take water from each of them. Chief Belt is in favor of more of these cisterns, and considers them the most economical method of providing a sufficient water supply for fire service. To permit of the large engines taking water from both openings in the hydrants, an appliance has been fashioned by the department machinist so that the two openings can be led to discharge into one to which the engine will attach. Tests of one of the large Metropolitan engines just mentioned showed that, when water was taken from one of the 2½-inch openings in the hydrant, it could be thrown through two lines of 2½-inch hose, 300 feet long with 1¼-inch nozzles, 170 feet. This was with a water pressure of 150 pounds and a steam pressure of 140. When both outlets in the hydrant were used the water was thrown 200 feet. A third test was made with three streams of water and one-inch nozzles, and each stream carried 209 feet. It is feared, however, that if the three big engines should be worked from the same main they would soon suck it dry. Tests with one engine on the water tower, with 1⅝-inch nozzle, gave a distance of 283 feet.

Work of a Montana Department

THE report of Chief Mentrum, of the fire department of Anaconda, Mont., makes a favorable showing for the force and its work during the past year. Fifty-nine alarms were answered during the

twelve months past and there were but nine false alarms. The equipment of the department consists of one La France engine, one hose wagon, a Seagrave fifty-foot extension truck and five horses. There are also about 3,500 feet of hose, of which 2,500 feet are in good condition. The property involved in fires amounted to $184,080, on which there was $73,678 insurance. The fire alarm system is operated by a gravity battery operating two circuits and twenty-four boxes, a tower bell, an indicator and gong, and about eleven miles of fire alarm wire. The purchase of two alarm boxes is all that is needed in the way of improvements for the coming year.

Pensions for New Jersey Firemen

A LAW has been signed by the Governor of New Jersey that will be of interest to every fireman of the State. This law will read as follows: 1. In all cities of this State, having a paid fire department, it shall be lawful for the municipal board having charge of said fire department to retire from service any officer or man permanently employed in such department whose duty requires active service in the extinguishment of fires who shall have become or shall hereafter become incapacitated, either mentally or physically, for the performance of such duty, whenever such incapacity is or shall be the result of injury received or sickness contracted while on duty, either in the performance or attempted performance of any duty connected with employment in such fire department, or in the performance or attempted performance of any extra or special duty upon which such officer or man may be detailed; the person retired shall receive an annual pension of an amount equal to one-half of the salary received by him at the time of such retirement.

2. If any officer or man permanently employed in any fire department in any such city shall be fatally injured while on duty, either in the performance or attempted performance of any duty connected with employment in such fire department, or in the performance or attempted performance of any extra or special duty, upon which such officer or man may be detailed, such municipal board shall allow to the widow, if any there be, or, if there be no widow, then to the dependent parent or parents of such officer or man permanently employed in such fire department, an annual pension equal to one-half of the salary received by such officer or man at the time of his death, to be paid to such widow during her widowhood, or, if there be no widow, to be paid to such dependent parent or parents as long as such parent or parents remain dependent, and where the officer or man is the only support of his parent; if such officer or man is the only support of his parents; if such officer or man shall not leave a widow or parent, but shall leave a child or children, such pension shall be applied, under the direction of the Mayor of such city, to the support of such child or children until they have attained the age of 16 years.

Fire and Police Personals

—Mr. William H. Ford was selected by the Council of Pocatello, Idaho, for the office of Chief of Police.

—Mayor Rolla Wells, of St. Louis, reappointed Chief Charles E. Swingley as head of the fire department.

—The appointment of Mr. C. E. Hollingsworth as chief of police of Missoula, Mont., was confirmed by the Council.

—Mr. William Farr was elected chief, and Mr. John Glace assistant chief of the West Hoboken, N. J., fire department.

—The Council of Braddock, Pa., "ripped" Chief Oliver McMichael, of the fire department, out of office and elected as his successor John Donovan.

—Chief Sydney R. Carter resigned as head of the fire department of Evansville, Ind., and the Board of Public Safety elected Capt. James L. Dunlevy as chief of the department.

—The Utah Supreme Court has decided that the confirmation of Chief of Police George Sheets, of Salt Lake City, was illegal, and it will be necessary for the Mayor to nominate another man.

—After a service of thirty years on the police force of Americus, Ga., for eight of which he held the office of chief, Mr. W. W. Wheeler tendered his resignation to the police commissioners, which was accepted.

—Mayor Tom L. Johnson, of Cleveland, O., forced the resignation of Chief of Police George E. Corner, who has been at the head of the department for seven years. Captain of Detectives Frederick Kohler was appointed in his stead.

—Chief Janssen, of Milwaukee, Wis., has approved the new pension bill which the committee on corporations of the State government expects to submit to the legislature in place of the one recently vetoed by the Governor.

—Chief of Police Gus. Kuemmerling and Chief of Fire Department P. E. Walsh, of Hamilton, O., resigned their commissions, and the Board of Control appointed Jacob Sipp Superintendent of Police and Adam Becker chief of the fire department.

—Chief Engineer Edwin L. Vaughn, of the fire department of Worcester, Mass., carried out his threat to resign, and Deputy Chief George S. Coleman has been acting chief. Chief Coleman will probably be selected by the Council to succeed Chief Vaughn.

—Chief William Gallas, who has been a member of the police force of Michigan City, Ind., for eighteen years, was summarily dismissed by the police commissioners, although no charges were preferred. The Chief will appeal to the Governor for adjustment of his troubles.

—The Grand Jury of Lackawanna County recently indicted fifty-nine of the councilmen of Scranton, Pa., charging them with maintaining a nuisance. This action was the result of the efforts of citizens to secure passable streets in return for the money spent on them.

—Chief Hogg, of Binghamton's (N. Y.) fire department, received a painful injury at a recent fire. The cords of his left hand were severed by falling glass, and it was necessary to perform an operation before they could be united. Assistant Chief James R. Eldridge will be in charge of the department until Chief Hogg fully recovers.

—The effect of the new code on offices of chief of police and chief of fire department at Dayton, O., has been the subject for some speculation, but it seems positive that both Chief Whittaker and Chief Larkin will hold over, as the code provides that no member of the police or fire department is to be reduced in rank or pay, except for cause.

—For the second time "Scenes in a Police Station," a play written by Chief Benjamin Murphy, of Jersey City, N. J., was given in that city for the benefit of the Police Mutual Aid Society. The play was well received and well supported, the first night every seat in the house being taken. The play was given every afternoon and evening for a week.

—The first Monday of last month Mr. John P. Quigley, chief of the Syracuse, N. Y., fire department, rounded out the quarter century as a member of the fire department of that city. Since August, 1897, he has held the office as chief of the department, succeeding to the position on the death of Philip E. Eckles. Chief Quigley is one of the ablest heads of fire departments in the country, and his administration of the fire forces of Syracuse has been progressive although conservative. He has brought the department up to a fine state of efficiency.

—A peculiar situation was created at St. Joseph, Mich., when the Council refused to ratify Mayor Starr's appointment for chief of police. The Council desired to keep Chief Morton, the present incumbent, but the Mayor said that he would remove Morton for good reasons, and has named himself as chief of the police department temporarily. The Mayor stated that he would, if necessary, take possession of the jail and police headquarters with an axe, and Chief Morton threatened to place the Mayor under arrest if he attempted to exercise police authority. A general mix-up was looked for.

—Chief John E. McGuire, of Savannah, Ga., fire department, recently had trouble with the foreman of Engine Company No. 1 because the latter refused to obey an order of Chief McGuire to repair one of the pieces of apparatus. Chief McGuire, as a consequence of this refusal, suspended the foreman for insubordination. It was stated at the time that the foreman was advised not to obey any orders of the chief by a member of the fire committee of the council. as the foreman told Chief McGuire that he would take no more orders from any one except the Council Committee. Chief McGuire has been supported by the authorities and the foreman received a severe reprimand for his action.

LITERATURE ON MUNICIPAL TOPICS

Reviews of Some Important Books—What the Magazines and Reviews Have to Say About Civic Affairs—Municipal Reports Received

Books

Storage Battery Engineering, by Lamar Lyndon, B. E., M. E., is called a "Practical Treatise for Engineers," and such it will prove to be on investigation. The relation of electro-chemistry to electrical engineering are very close in this point, but as many electrical engineers are not chemists a special treatise on this subject of storage batteries supplies a need long felt by many. The fundamental principles are given proper consideration, but little space is devoted to theoretical discussion. The "General Principles of the Storage Battery" and "General Requirements" form the subjects of the first two chapters in Part I. The lead cell itself is the general subject of this part. Its diseases and remedies, its care and management, the general types and kinds of cells, their durability and deterioration, etc., are treated of in the subsequent chapters. Part II. is devoted to "Auxiliary Apparatus, Systems, Applications." In this are included the uses of batteries, end cells, resistances, switches, indicators, different kinds of boosters, rheostats, circuit breakers, two- and three-wire systems, alternating current systems, line batteries, plant efficiency, etc. This second portion of the work is of importance because of this discussion on the practical application of the storage battery in its commercial side. Supplied by THE MUNICIPAL JOURNAL at the publisher's price of $3.

THE liquor saloon plays a part in our political and social life not fully realized by the advocates of temperance. It has become so deeply rooted in the lives of the lower grades of society especially that all attempts at its removal have been unsuccessful. To eliminate such an important portion of the lives of many millions, it is necessary to offer something as a substitute that will prove more alluring and present more attractions than that taken away. The Rev. James E. Freeman, of Yonkers, N. Y., believes he has found this substitute, and in *If Not the Saloon, What?* describes the Hollywood Inn and the work it has done to eliminate the saloon by substituting something that has all and more of its attractions and none of its evils. The Hollywood Inn is, in short, a large club whose members are made up from the poorer classes, but where each one pays his moderate yearly dues and is entitled to all the privileges as is the case in clubs of the rich. While the club is partially supported by religious bodies, no trace of religion or charity is permitted to enter into the work and so the rocks on which many a similar scheme has been wrecked are avoided. The author reviews at length the reasons why these schemes have failed, and strikes the key-note when he says: "The Church, with all its splendid parochial mechanisms, has endeavored to convert men from what it conceived to be the error of their ways, by insisting that *they,* not *it,* must change their point of view: hence much of the failure." "To understand properly any phase of life, we must assume its point of view. The world presents a very different aspect behind the grimy factory pane from what it does when looked at through the clear plate glass of the drawing room." Supplied by THE MUNICIPAL JOURNAL at the publisher's price of 50 cents net.

Periodicals

The May issue of *Cement* has a number of articles that are of interest to those engaged in the manufacture or construction of cement work. *The Preservation of Structural Steel in Buildings, Percolation Testing Machine for Cement, Perfect Stone Making, The Permeability of Concrete Under High Water Pressure, Crusher Dust in Concrete,* by Capt. Harry Taylor, U. S. Engineers, are some of the many interesting articles in this issue. New York, N. Y. Published monthly, price $1.00 a year.

Road Building in Porto Rico, by A. Stierle, superintendent of public works of that island, appears in *The Good Roads Magazine* for May. How the work of building good roads is carried on is demonstrated, as well as the difference between the American and Spanish methods. *The Federal Government and Road Construction,* by Hon. T. F. Kluttz, and *The Economy of Good Roads,* by W. W. Crosby, are articles appearing in this number. New York, N. Y. Published monthly, price $1.00 a year.

William Hemstreet contributes an article to the May *Gunton's Magazine* on *Loafers and the Police,* in which the author inveighs against the necessity for a warrant in some cases of unlawful acts when prompt action by an officer at the time, on complaint of a citizen, is necessary to secure the arrest of the culprit. The action of Judge William J. Gaynor in scoring the police for making arrests when the acts were not committed in their presence, the author points out as having encouraged roughs in their lounging and petty acts annoying to citizens. Mr. Hemstreet holds that a warrant should not be necessary in any such cases and suggests that the law should be so amended that an officer could arrest for a misdemeanor not committed in his presence and take along the complainant as a witness. New York, N. Y. Published monthly, price $1.00 a year.

California Municipalities for April contains some *Late Information on Oiled Roads,* furnished by T. F. White, of Chico, Cal., and tells how the different kinds of soil are to be treated and the remedies for different conditions. Douglass Young writes on *Accountability for Public Property.* San Francisco, Cal. Published monthly, price per year, $1.00.

Another of the interesting stories about American cities that are not all that they should be appears in the May issue of *McClure's Magazine,* under the authorship of Lincoln Steffens. Mr. Steffens has been working east and takes as his subject, *Pittsburg, a City Ashamed.* He tells how the good citizens of the Smoky City made strenuous efforts to break through the ring that had tightened its grip on the city and, when the ring was broken, found that another ring had been formed around them by men who had used them for revenge on the old ring leaders. The story of how the old ring was formed and strengthened until one man ruled the city shows worse conditions than even existed in New York under Tammany. The efforts of a few earnest men, especially George W. Guthrie and Oscar McClintock, aroused the busy citizens to action and the ring was broken. A mutual agreement had been signed by the "boss" of Pittsburg and Senator M. S. Quay to divide the control of the political situation between them. A fac-simile of this agreement is given in the article. New York, N. Y. Published monthly, price per year, $1.00.

Public Abattoirs is the subject of an article printed in *The Surveyor,* of London, and read before the Bristol Society of Architects by R. Stephen Ayling. A description of the abattoirs in Paris is given, including a general plan of the arrangement of the buildings of such institutions. A short reference is made to the Dublin abattoir, and, in conclusion, speaks of the abattoirs in Germany, where most of these places are managed by the town parishes and not by the butchers' guilds. The author was distinctly in favor of the establishment of these institutions and the abolishing of the private slaughter houses. London, Eng. Price per year, 19 shillings. Issued weekly.

An extended description of the municipal electric plant at Aberdeen, Scot., was given in *The Electrical Review,* of London, under the title of *The New Aberdeen Electricity Works.* A number of fine illustrations accompany the article and afford the reader an opportunity of seeing how the interior of the plant looks. London, Eng. Price per year, 30 shillings. Issued weekly.

The issue of May 1 contains as a leader an article on *Housing in Edinburgh,* by Judge W. S. Brown. This article tells how the corporation is fighting a grave evil and how the slums of the city are being cleared away. The death rate has been growing less as the densely packed quarters of the city gave way to decent dwellings—falling from 26 per 1,000 to 19. Illustrations are given of some of Edinburgh's housing schemes as well as some of the slums before they were demolished. The new dwelling in course of erection at Westminster to do away with a portion of the slums also appears in this issue. London, Eng. Price per year, 8s. 8d.

Parasites Affecting Animal Food is the subject of an article in *The Sanitary Record* for April 30. This is a description of a few of the common food parasites and those that infest living animals and how and where they make their appearance. London, Eng. Price per year, 15s. Issued weekly.

Among the many finely illustrated articles in the May *World's Work* is one on *Transporting New York's Millions,* by W. W. Wheatly. The author shows how the greater part of the island of Manhattan is being given over to business purposes and the people are settling in the outer districts. The enterprise of private companies and public progress are enabling New Yorkers to do so. The most difficult transit problem in the world is presented in New York, for the street railways there carry more passengers than are transported on all the other railroads of the Western Hemisphere. An article on *The Louisiana Purchase,* by Charles M. Harvey, is accompanied by a series of cuts showing typical street scenes in the principal cities through the country embraced within the purchase and illustrating the rapid growth of the different municipalities. New York, N. Y. Price per year, $3.

Charities for May 2 contains an article on *First Fruits of a Municipal Experiment,* referring to the work of the New York Tenement House Department. Illustrations show the hovels and insanitary way in which the poor are housed and which the department has been endeavoring to correct. It is stated that the department inspectors found a third of a million bedrooms having neither light nor air except through the door. The law requires that, in new tenements, a sash-window of fifteen square feet must open on a street, yard or court. The department has completed its investigations and will cause the unlawful conditions to be gradually rectified. An account of *Echo Hills,* the model village built by the New York Juvenile Asylum, is given also. New York, N. Y. Published weekly, price, $2.00 a year.

A new fire-proofing material is described in the April issue of *Insurance Engineering.* It is called "Ferroinclave," and its use in construction of buildings is well illustrated as well as described. A discussion on the subject of *Fire Protection* is contributed by Charles Arthur Hague. Interesting data regarding typical fires and the lessons they teach are given in short paragraphs that should be read by all builders. New York, N. Y. Published monthly, price per year, $3.00.

A Study of City Life is presented in *The Municipal Journal,* London, in the issue for April 24. This is a description of the slums of York, and illustrations show the horrible conditions in that city. Efforts are being made to clear out the old buildings and substitute model dwellings. *The Burden of London Rates* shows how the present taxes of London are the highest for this generation, and the causes of the increase. A description is also given of the new tramway lines at Newport. London, Eng., price per year, 8s. 8d.

The "Winter Issue" of *Municipal Affairs* is devoted to the papers and proceedings of the Municipal Ownership Convention held in New York the last of February. This issue will prove of the greatest value to city officials and all interested in municipal problems as it contains papers on all important municipal topics giving the *pro* and *con* of disputed questions. The following are the papers presented to the convention, some of them having already appeared in THE MUNICIPAL JOURNAL and others will be printed in future issues: *Problem of Municipal Ownership,* by John C. Agar; *Municipal Operation Needed to Correlate Local Franchises,* by John DeWitt Warner; *Municipal Operation in the United States,* by Charles Waldo Haskins; in *Europe,* by Robert P. Porter; in *Great Britain,* by Robert Donald, and in Germany, by Edward T. Heyn; *Municipal Electric Lighting,* by Victor Rosewater (affirmative) and James Blake Cahoon (negative); *Municipal Gas Lighting,* by Alton D. Adams (affirmative) and Walter S. Allen (negative); *Municipal Ownership of Telephones,* by U. N. Bethell (negative) and Frank Parsons (affirmative) and in *Great Britain,* by A. R. Bennett; *Municipal Street Railways,* by C. R. Bellamy (affirmative) and Charles T. Yerkes (negative); *City Owning and Leasing,* by Edward M. Shepard; *Massachusetts' Experience,* by Louis D. Brandeis; *City Ownership of Water Supply,* by William R. Hill; *Public Control of Corporations,* by Charleton T. Lewis; *Regulation and Taxation,* by Allen Ripley Foote; *Taxation of Franchises,* by Edwin R. A. Seligman; *Labor Clauses in Francnises.* by Raymond V. Ingersoll; *Referendum and Initiative,* by George H. Shipley; *Growth of Demand for Municipal Ownership,* by Clinton Rogers Woodruff; *Experiments in Louisiana,* by William Wirt Howe; *Public Franchises in Toronto,* by Thomas Urquhart; *Conditions of Municipal Success,* by Milo Roy Maltbie; *Chicago's Experience with Municipal Lighting,* by Edward B. Ellicott; *Municipal Lighting in Wallingford, Conn.,* by A. L. Pierce; *Municipal Lighting in Detroit,* by Frederick F. Ingram; *Analysis of Municipal Electric Lighting in Detroit,* by Joseph E. Lockwood; *Public Control of Corporations,* by R. R. Bowker; *Taxation of Public Utilities,* by Wheeler H. Peckham; and *The Ford Tax Bill,* by John Ford. Issued quarterly by the Reform Club of New York. This issue is sold for $1.00. The regular subscription is $2.00 a year.

Municipal Reports Received

WE have received a copy of the annual report of the Comptroller of Baltimore, Md., for the year 1902, made in accordance with the uniform system of accounting of the National Municipal League.

City Engineer B. T. Fendall, of Baltimore, Md., has sent his annual report for 1902.

The annual reports of the city engineer, superintendent of parks and health officer of Mankato, Minn., for 1902, have come to hand.

We have received a copy of the twenty-sixth annual report of the New Jersey State Board of Health.

The compliments of the Lewiston, Me., Water Board accompany their twenty-third annual report.

We are indebted to City Engineer Robert Hooke, of Chattanooga, Tenn., for a copy of the annual reports of that city for 1901-2.

The annual report of the city treasurer of Colorado Springs, Colo., has been sent us, as well as that of the street cleaning department of Washington, D. C., for 1902.

City Engineer Ernest W. Bailey, of Somerville, Mass., has favored us with his annual report for 1902.

Mr. Kenneth Allen, engineer and superintendent of the waterworks, Atlantic City, N. J., has sent us the annual report of the Board of Water Commissioners for 1902.

We have received a copy of the act creating the board of park commissioners of Nashville, Tenn., and the rules and regulations for the government of the parks and the instructions for the employees.

Mr. Theodore A. Leisen, engineer and secretary to the board of park commissioners of Wilmington, Del., has kindly sent us a copy of the beautiful report of his department for 1902.

A copy of the artistic park report of St. Paul has been sent us.

The annual report of the department of lamps of New Haven, Conn., has been received, as has also the report of the fire department of Lowell, Mass., for 1902.

Mr. C. C. Vermeule has favored us with a copy of his treatise on *The Floods of March, 1902,* as reprinted from the annual report of the State Geologist of New Jersey for that year. He speaks of the effect of the proposed drainage works on the Passaic floods.

REVIEW OF MUNICIPAL REPORTS

Use of Coagulent in Water Filtration—Success of Hand Street Sweepers—Should Not Hurry Street Work—Lay All Sewers and Mains Before Paving

Should Plan Paving a Year in Advance

THE Board of Public Works of Saginaw, Michigan, calls attention to a serious defect in the method of building street pavements. Present and past experience demonstrates that all street improvements should be decided on in the summer preceding the year in which it is to be executed. This will permit of all underground connections being made in good weather and the wall excavations have sufficient time to settle before laying the improvement upon it. No permanent improvement should be made in any part of the city that is not supplied with sewer, water and gas mains. Another advantage of ordering street improvements months in advance is that time is given to make all the necessary surveys, plans, etc., and to allow careful study before deciding on the method of procedure. The Board asks that power be given it to decide upon the character of paving for any street in the same manner as it has the power to determine the size of sewers or water mains. In its opinion this will prevent mistakes being made by the property owners who are not well up on the subject of street paving.

A permanent sidewalk ordinance has gone into effect. This provides for the consideration of walks of imperishable material only to be laid on a grade established by the engineering department and in accordance with its specifications. The Board asks that a map be prepared and posted to date to facilitate the work of the council in ordering the construction of walks. Walks should be ordered and built in whole blocks or several blocks on one side, at a time.

All public sewers and sewer basins should be systematically cleaned and it should not be necessary for a sewer or basins to stop up to know that they need cleaning. The system of requiring abutting property owners to make a deposit guaranteeing sufficient takers to pay interest on the investment before a water pipe is laid in any street, except for fire protection, is considered to be just and equitable to property owners and should be continued. All streets having sewers should be given preference in deciding where mains are to be laid. Inasmuch as the state of Michigan has no law governing the protection of water supplies, the Board recommends that such law should be enacted as would give the city authority to protect the water of the Superior River, from which the city obtains its supply.

Hand Street Sweepers Give Satisfaction

THE work of cleaning the streets of Columbus, Ohio, is told in an interesting manner in the annual report of Superintendent Sylvester Condon. While the expenses of the past year have been more than those of preceding years, the area cleaned is more than double what has ever been gone over before. Mr. Condon gives the cost of cleaning a block by machines at 37.2 cents, which is less than estimated by the engineer at the beginning of the year. This includes salaries, repairs, new machinery, etc. While in his opinion every department should endeavor to conduct its work as economically as possible, this should not be carried so far as to sacrifice good results to small expenses. The usual method of hauling snow and dumping it in vacant places was departed from and with the permission of the engineering department the snow was shovelled into the main sewers. The higher temperature of the sewers melted the snow as soon as it struck the current and it was carried off as rapidly as the water. Much time and expense were saved by this method. Much of the work of the department was hindered by violations of ordinances governing the littering of streets by over-loaded and badly constructed wagons and the aid of the police is asked to enforce this ordinance in future. Superintendent Condon asks the enforcement of an ordinance compelling the cleaning of sidewalks by nine o'clock in the morning, in the business districts especially. He says, "Cleanliness of the streets denotes the progress and to a great extent, the character of the inhabitants, and if this appearance and actual condition is favorable it redounds to the city's credit and profit." He asks that the practice of using the streets for storing building material should be prohibited.

For six months twelve hand sweeping machines made by the Sanitary Street Sweeping Company of Washington, D. C., have been in use. They were introduced last year and used with great success in the business districts. They work best on asphalt and brick according to the Superintendent, but even on granite block are a great improvement over the hand broom in that the territory is covered in much less time. "Streets that were formerly swept three times a week were under this new method swept daily at a less cost per square. There is no question but hand cleaning is the only effective method in the congested business districts."

The total cost of sprinkling was one-half more than in 1901, but more than twice the territory was covered. To provide for additional work more sprinklers must be procured. Last August the use of bags for the hand patrol was discontinued and steel cans substituted with more satisfactory results. During the winter the machinery was thoroughly overhauled and repaired to be ready for the opening of the season. The cost of cleaning per great square by the hand patrol was .167 cents. The total number of miles of paved streets in which sweeping was done by machine and hand patrol was 118 and the total cost $46,952.78.

Augusta's Public Works Department

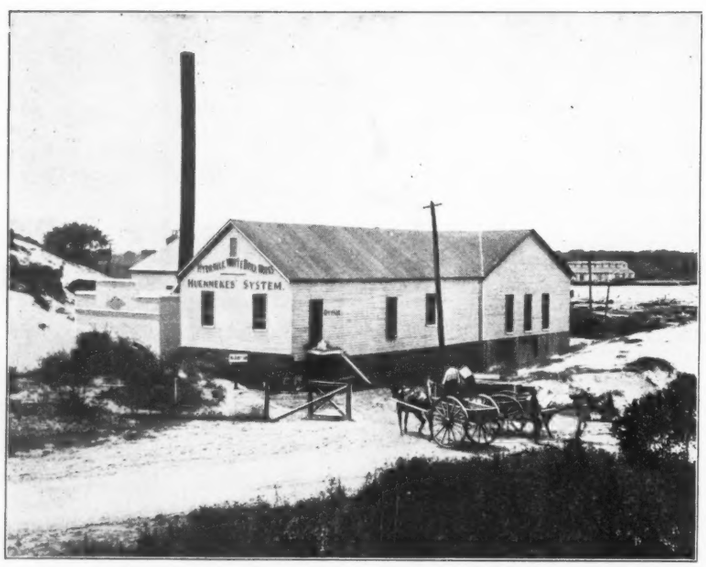
ALTHOUGH the water in the river from which the city of Augusta, Ga., obtains its supply resembles liquid mud the filtered water is always uniformly clear, according to Commissioner of Public Works Wingfield. A good supply of water is always abundant, but the foreign matter in the Savannah River is so fine that it is difficult to remove every trace of it by means of a sand bed filter. The use of a coagulent, however, has been successful in clearing up the water and all coloring matter is likewise removed with foreign substances. Superintendent Maxwell of the Water Works Department has changed the usual method of supplying coagulent to the filters, the sulphate of alumina being supplied to the reservoir instead of at the filter plant itself. This allows more time for action and the best results are obtained from a small quantity. A reduction of the cost therefore of operating the water works has been obtained this year, the amount being $11,392.55 as against $15,145.43 last year. Constant watchfulness has prevented a too great wastage of water and the services of the city plumber have been found to be invaluable. The city plumber taps the water mains and sewers running the service from the main to the curb line. The charge for this work, which is approximately the cost of it, is made against the property owner. No one else is allowed to do this work. Heretofore the connections were often imperfectly made, some being laid so near the surface that they were torn out when street improvements were made. All this has been obviated by the city plumber who understands his business and makes all connections in a uniform manner.

The Commissioned calls attention to the asphalt pavement on Broad street, which is in a wretched condition. The method to be adopted in making repairs to it has been under consideration, the cost preventing all the work being done at once. Commissioner Wingfield thinks that a new asphalt pavement should be laid with a guarantee of some ten years. As the work would cost over $80,000 the expense should be spread over two or three years, or an arrangement should be made with a contractor for an annual payment of $10,000 or $15,000. The total cost could be reduced twenty-five per cent. by narrowing the roadway on the outside and parking the centre of the street, but Commissioner Wingfield is of the opinion that this plan would be opposed on account of the inconvenience in crossing. He submits, in addition, a very peculiar reason for not carrying out this plan, and that is that the park in the most prominent business street would take away any semblance of a great city.

SOMETHING NEW IN THE BRICK LINE

Bricks Without Clay—Manufactured from Sand and Lime—"System Huennekes"—Adapted to All Kinds of Municipal Work Where Bricks Are Needed

When Pharaoh compelled the captive Israelites to make bricks without straw he was looked upon as an unreasonable and cruel taskmaster, but the development of the industry has demonstrated the uselessness of straw in the manufacture of bricks. Less than a decade age it would have been deemed easier to make bricks without straw in Pharaoh's time than to make bricks without clay in the present time. But the art of brick making has been greatly improved by recent inventions, so that brick makers are no longer dependent upon certain kinds of clay. These inventions make is possible to manufacture bricks with sand and lime. It is said of these sand bricks, manufactured according to the "System Huennekes," that they are cheaper in price, can be used for any kind of construction—in many cases much preferable to the ordinary clay bricks—can be given the greatest diversity of shapes and colors and can be manufactured equally well in summer or winter.



SAND-BRICK PLANT, WILMINGTON, N. C.

City and sanitary engineers, building committees and all others interested in any construction work connected with the municipality where bricks are used, will be interested to know that these sand bricks are without a superior for sewer work, as facing bricks for subway construction, the interior or exterior facings to public buildings, such as city halls, court houses and other buildings, large or small.

The following account of tests of lime and sand building brick manufactured by the "Huennekes System" affords almost conclusive evidence that the foregoing statements, touching the qualities and values of the sand brick, have not been exaggerated. The tests referred to were conducted in the laboratory of metallurgical engineers and chemists in Pittsburg, and reported by Mr. John M. Bailey. Three bricks were tested and they were shown to have a crushing strength per square inch of 3,518, 4,162, and 3,859 pounds respectively. In the absorption test, covering a period of forty-five hours in water, there was a gain of 11.6 per cent., 8.57 per cent., and 11.3 per cent. respectively. The absorption after freezing test amounted to a gain of 12.4 per cent., 8.8 per cent., and 11.4 per cent. respectively. The freezing test was satisfactory in each instance. In the test to ascertain the crushing strength per square inch, after freezing, in which only two bricks were involved, they were not crushed at 4,137 pounds per square inch and 5,202 pounds per square inch respectively, and showed only slight cracks at an actual load of 105,000 pounds, the limit of the machine.

In conducting these tests Mr. Bailey said "Half bricks were used in absorption tests; these bricks were dried thoroughly before immersing in water. After remaining in water forty-five hours, bricks were frozen four hours at a temperature of 14° Fahr., then thawed in warm water twelve hours, frozen again at a temperature of 9° Fahr. for a period of three and one-half hours, thawed in hot water three hours, frozen at a temperature of 12° Fahr. for three and one-half hours, and finally thawed in hot water for twelve hours. Final absorption test made and then bricks were again thoroughly dried. Bricks showed no signs of cracking or disintegration."

Lime brick were first manufactured in Germany and have only been recently manufactured in this country. About two years ago the manufacture of sand brick was introduced in the United States by H. Huennekes & Co., of 114 Liberty street, since which time nearly a score of plants have been erected in various parts of the country. One of the first to be successfully operated was at Wilmington, N. C., two views of which accompany this article. This plant has been in operation for a year. The product of this plant has been used in all kinds of buildings with great satisfaction. A brief description of this factory will not be without interest to the readers of the Municipal Journal and Engineer.

It is said to be a very simple affair, consisting of a power house and structure containing machinery for pressing and hardening brick. In the process of manufacture the sand is taken from the ground just as found, wet or dry, is mechanically mixed with a small per cent. of lime usually ranging from four to five per cent., the lime being measured out automatically. After mixing, water is also added in sufficient quantities to enable the mass to be pressed in the form of bricks, and the whole mass is then conveyed to a press which resembles in its operation an ordinary clay brick press, though it has peculiarities of its own in the way of being built for more pressure than the ordinary clay press, and to prevent sand from getting into the working

SHIPPING YARD OF WILMINGTON PLANT

parts. The bricks are hard enough when they come from the press to be stacked on small iron cars, each car containing usually 1,000 bricks. An entire train of these cars, as a rule there being twenty of them, is run into the hardening cylinder, which hardening cylinder is nothing else but a steel drum, which is fitted with rails and some appliances being a particular part of this system and process. After the hardening cylinder has been filled with the cars the same is hermetically sealed and steam is turned on under a pressure of 120 pounds to the square inch. The mixing of the sand and lime, manipulation of the steam and other incidental operations are of the greatest importance as to the quality and hardness of the brick, and cannot be obtained otherwise or taught by anybody else except a person who has considerable experience in the art. The bricks remain under this treatment from six to twelve hours, then the head of the hardening cylinder is removed and the train of cars run out of the same, and the bricks are ready and immediately available for building purposes. The whole operation of hardening these bricks consumes, therefore, not more than ten hours, and a factory of the above description and size will turn out from $18,000 to 20,000 bricks a day of ten hours.

New Method of Making Limestone Brick

THE United States Consul located at Leipzig, Germany, some time ago reported a new method for making limestone brick to the State Department, which was published later in the daily Consular Reports. As this is a matter of general interest to the readers of the MUNICIPAL JOURNAL AND ENGINEER, we quote his report in full:

"Burnt-clay bricks, like natural stone, have served as building material from the beginning of history, among nearly all races. Recently, a formidable rival has sprung up in the sandstone brick. This brick is the product of quartziferous sand, with which a proportionately small amount of lime is mixed, the whole mass being subjected to a high pressure of steam. The result is an extremely hard, water-tight product, impervious to frost or weather and unaffected by all acids. Like every new industry, sandstone brick making has had many technical difficulties to overcome, the principal one being caused by changes in the weather. In cold, wet weather much poorer results have been obtained than in warm, fine weather. Chemists and experts have tried to find a way by which uniform degree of excellency would be insured; but all failed until the Zurich chemist, Wilhelm Schwarz, invented a process by which good results could be obtained under all circumstances. Mr. Schwarz found that it was necessary to give the mixture an exact quantity of moisture, as well as prepare and mix it at a certain temperature, so that the combination of the silicic acid in the sand and lime should begin to take place before the mixture is pressed into brick-forms. In this way, all deleterious aeration of the lime is avoided during the manufacturing process. Mr. Schwarz has invented a process by which the amount of moisture can be regulated—namely, mixing dry sand with lime in a vacuum, so that any aeration of the lime by the carbonic acid of the atmosphere is impossible. At the same time, the temperature is raised to and kept at a certain degree by steam heat, and then a certain quantity of moisture in the form of steam is admitted. By this means, the preparatory process is safely finished, the action of the steam causing the condensation of the silicic acid in the sand and lime, and so giving the proper proportion of cementing particles to the mixture.

"For employing this process, a machine has been built in which the preparatory and working process can be carried out—a mixing machine provided with revolving arms for mixing the sand and lime, steam-tight, with an air pump attached to exhaust the air and also to draw out any excessive quantity of moisture. Inside is a tube for admitting the exact quantity of necessary steam. By properly managing three valves, the limestone raw product can be made of uniform quality, while formerly several machines and apparatus, which needed constant attention, were necessary for making this product, and then the results were never entirely satisfactory.

"With the Schwarz invention begins a new era in the limestone-brick industry that will be of great importance in all countries, and particularly in regions where there is neither clay nor stone, but where there is plenty of sand."

This system has been in use for the last fifteen years in many European cities and has given eminent satisfaction. It has lately been introduced in America by the "Schwarz-System" Brick Company, 10 Bridge street, New York.

A New Street Sign

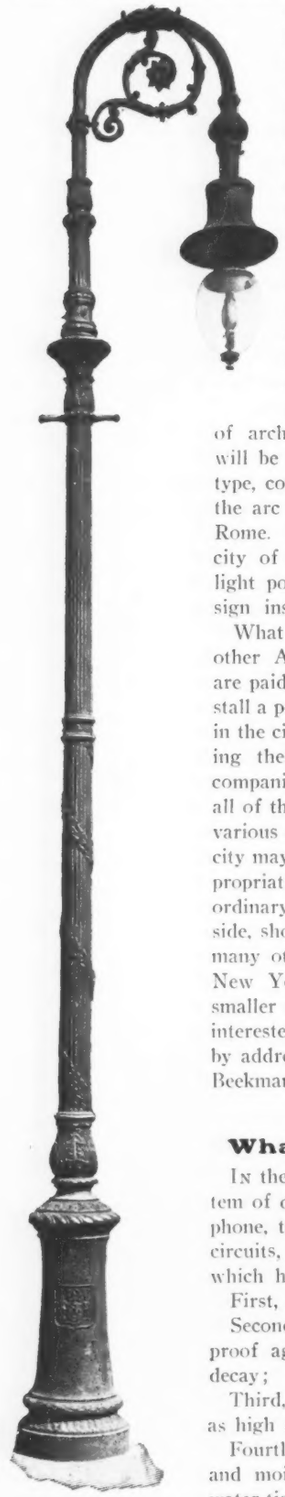
THERE are more than one thousand illuminated street signs in New York City which show up with equal brilliancy either day or night, and so impart desirable information to the transient visitor or the busy New Yorker. These particular signs are placed only on electric light poles and are illuminated by means of mirrors placed at the proper angle within the sign, borrowing the light from the arc lamp overhead. The accompanying illustration gives one a good idea of its appearance. The great need in our modern cities is for an illuminated sign, but hitherto the large expense involved in maintaining a light with which to illuminate it has prevented the general adoption of such a sign. Now that it can be erected and illuminated without an annual expense for maintenance, the way is open for its general adoption. They have been used in New York for over a year, and have given universal satisfaction. Baltimore is now considering their installation, and for a number of weeks has had one on exhibition, located on a prominent street, that has excited much comment in the "Monument" City. When they are adopted in Baltimore, they will contain the name of the street and the number of the block. There is no particular reason why they should not be adopted in all the large cities. They are manufactured by the Electrical Reflector Company, of New York City.

Novel Method of Macadamizing

A NOVEL way of macadamizing a road has been carried on near Weaverville, Cal., on Oregon Mountain. The side of the mountain is covered with quartzite which has been broken up by nature in uniform cubes of from two to four inches square as if it had been put through a stone crusher. The pulverized road material was hydrauliced down onto the road, covering it to a depth of two feet and twelve feet wide. One hundred and forty boxes were laid from the bank to the road, and from there the boxes were laid along the inner bank, a swinging box at the end being so arranged that the quartzite was deposited where it was needed. Water from a running ditch under pressure was turned into the boxes.

Artistic Street Fixtures

The development of American cities has been so rapid that the authorities have not had sufficient time to devote to the questions of minor importance, such as the installation of uniform and artistic street fixtures. While New York should take the lead in these matters, because it is the largest and one of the oldest in the country, yet even the casual observer notices its deficiencies in this direction and they jar upon his sensibilities, especially as he recalls the fact that the annual expenditures of the city amount to $100,000,000. The casual observer wonders why a portion of this immense fortune, spent annually, should not be applied toward equipping the city with suitable street fixtures, similar to the one shown in the accompanying illustration. This is a design which has met the approval of architects and electrical engineers. As will be seen, it is of the Italian renaissance type, combining some of the best features of the arc light poles now in use in Paris and Rome. It is exceedingly unfortunate that the city of New York cannot have an electric light pole of this or some other artistic design installed throughout the city.



Copyright, 1903, J. L. Mott Iron Works

What is true of New York is true of every other American city. The light companies are paid well enough for their services to install a pole of artistic design everywhere within the city limits, and the City Fathers, by using their authority, could compel lighting companies to use such poles. They need not all of them be of the most expensive type, as various designs are manufactured, so that the city may adapt its choice to the size of its appropriation; but there is no reason why the ordinary ugly pole, with its steps on either side, should be installed along Broadway and many other of the leading thoroughfares of New York, not to mention the streets of smaller cities. Committees and city officials interested will obtain some useful information by addressing the J. L. Mott Iron Works, 84 Beekman Street, New York.

What a Conduit Should Be

In the construction of an underground system of ducts for use in connection with telephone, telegraph, railway, lighting, or power circuits, it is essential that a condit be used which has the following characteristics:

First, It should be electrolysis-proof;

Second, It should be non-corrosive and proof against any form of deterioration or decay;

Third, Its insulating qualities should be as high as possible;

Fourth, The conduit itself should be dry and moisture-proof. The joints should be water-tight, so that gas or water cannot penetrate;

Fifth, The joints should be self-aligning and insure a permanently fixed alignment;

Sixth, All injuries to covering of cables by drawing in and out of subway should be entirely provided against by using a duct which has a round hole with a smooth and strictly non-abrasive inner surface;

Seventh, It should be light in weight to facilitate cheapness in freighting, handling and laying;

Eighth, It should be strong and tough for proper protection of cables and to avoid loss from breakage in shipping and handling;

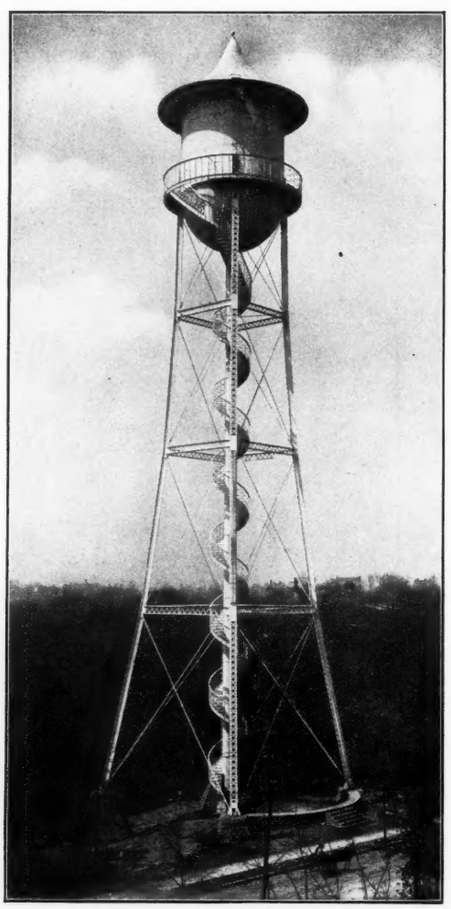
Ninth, It should be made in long sections or units to reduce the number of joints, thus facilitating rapid and cheap laying.

The Bituminous Fiber Conduit (patented), made by the American Conduit Company, Philadelphia, Pa., has all these qualities. Further particulars and information will be furnished on application.

Water Tower Gives Good Service

In 1901, a water tower was built at College Hill, Ohio—a suburb of Cincinnati—having a capacity of 100,000 gallons. As will be seen in the illustration, it was built of steel and mounted on stilts. It is one hundred and fifty-four feet high and readily reached by a spiral stairway. The water works plant of which this tower is an important part, consists of about four miles of street mains with necessary hydrants and valves and a small pumping station.

The water supply is pumped from the city water works of Cincinnati to a receiving basin, from which point it is elevated to the tank by a fifty-horse power gasoline engine and a three-quarter million gallon triplex pump. It requires about three hours pumping each day to keep the tank filled.

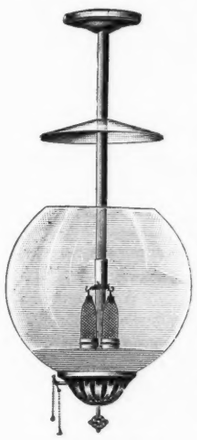


The pumping plant is maintained at a very slight expense, the engineer stating that the operating expenses, including gasoline and attendance, amounts to only about $200 a year. The town-marshal attends to the pumping, for which service his salary is slightly increased. This plant is a departure from what was formerly used for water works purposes, the tower taking the place of the old-fashioned standpipe or the direct pressure system and the gasoline engine taking the place of steam machinery.

The plant was installed by the Chicago Bridge and Iron Company, Washington Heights Station, Chicago, Ill., and is said to be adapted to towns up to 25,000 population.

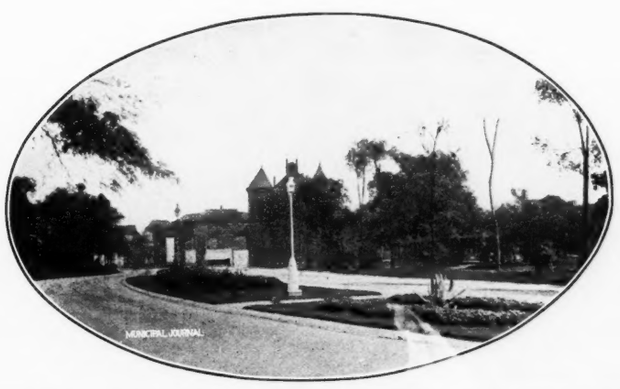
First-Class Lighting at Low Rates

THERE are few cities which are not vitally interested in the subject of public lighting. "While millions are expended annually by cities, towns and villages," said one who has given much thought to the question of public lighting, "there is no department of municipal government in which so much money is needlessly wasted as in that which has to do with public lighting. There is too little common sense employed in the determination of the candle power of the various lamps used for street lighting purposes, and scarcely any attention is given to the adaptation of these lights to local conditions. For instance, a 2,000-candle power arc light will be placed at the intersection of two streets which are heavily shaded, and another one three or four hundred feet away at the intersection of two other streets, with no provision for lighting the sidewalks, the consequence being that the sidewalks are thrown into a deep and almost impenetrable shadow. If, on the other hand, lamps of from 60 to 120-candle power were distributed at intervals along either side of the street, it would not only lighten the roadway, but the sidewalk, and at the same time reduce the expense by reducing the candle power of light employed. People have gone mad in the use of large candle power arc lights. They should get back to the use of lamps of smaller candle power and show a little common sense in the adaptation and distribution of the lamps."



MERIDEN HYDRO-CARBON ARC LAMP

While this observer is not altogether correct, there is a growing interest in just this phase of the lighting question. The readers of the MUNICIPAL JOURNAL AND ENGINEER are interested in the experiments of some cities which are solving this very problem. Some cities, towns and villages have used to great advantage the hydro-carbon light manufactured by the Meriden Hydro-Carbon Arc Light Company, of 9 Ashland Boulevard, Chicago, Ill. This light is inexpensive and well adapted for the lighting of cities, villages, parks, public grounds, and lawns, or any place where an electric light can be used, with the advantage that every light is independent. The fluid is contained in a steel reservoir at a centrally located supply station, or in the bottom of each lamp post as may be planned at the time of installation. Under a charge of compressed air, a copper tube, the size of an electric light wire, carries the fluid to the generator above the flame.



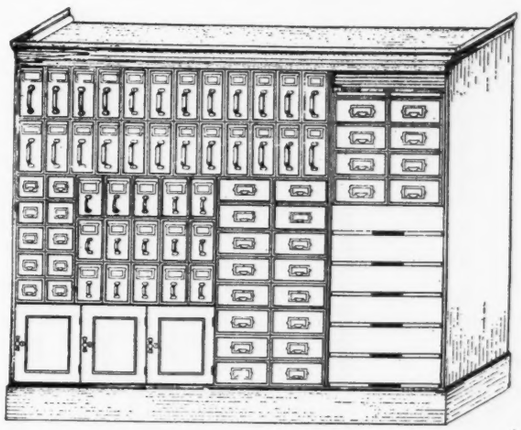
LIGHTING OF WASHINGTON BOULEVARD (CHICAGO) WITH MERIDEN LAMP

The reservoir used in each lamp post furnishes sufficient material to burn one hundred hours, without replenishing, at a cost from 60 to 75 cents, or about three-quarters of a cent per hour. If the central station system of supply is installed, the reservoir can be of any desired capacity for supply of any desired number of lights. A ladder is not needed for lighting. The burner is lowered within a few feet of the ground by means of a small cable and windlass enclosed in base of post, then a few drops of alcohol are injected in a cup at the bottom of the burner and lighted with a match. It has a simple mechanical device so arranged as to extinguish the light at any hour of the night. The lighting and caring of this light is less than the care of an electric arc. This light meets the long felt want for small towns where they cannot afford an electric plant, and large cities can make a saving of from fifty to one hundred per cent. over electric lighting, besides getting a better light, as it will furnish a greater radiating surface than an electric arc without the deep shadows.

All Steel Combination Cabinet

The Krag Metallic Construction Company, Pontiac Building, Chicago, Ill., manufactures card indexes, cabinets, trays, cards, indexes, combination cabinets and everything else in this line. The products are made of steel and are gotten up after the most artistic designs.

The accompanying illustration shows the Krag Imperial Combination Cabinet. It is seven feet long, six feet high, containing twenty-four document files, sixteen cheque files, fifteen deposit ticket



KRAG METALLIC COMBINATION CABINET

files, twelve note cases, six roller book shelves, three cupboards with Yale locks and one roller curtain, all made entirely of steel. This and other products of this company are especially adapted for use in city halls and other public buildings. Estimates and drawings are furnished on interior vault construction. Catalogues and price lists can be had upon request.

Potter Trench Machine Patents Sustained

SOME time ago the patents for the Potter trench machine were infringed by sewer contractors of St. Louis. Although the contractors admitted their infringement, they refused to settle the damages and suit was brought against them in the United States Circuit Court in St. Louis by the Potter Manufacturing Company, of Indianapolis, Ind., the owners of the patents. On the 12th of May, 1903, the United States Circuit Court awarded judgment against the defendants for damages and costs, granting a perpetual injunction restraining the contractors from future infringements of the Potter patents. The validity of the patents upon which the business of manufacturing and selling the Potter trench machine is based is hereby fully and firmly established.

The Potter trench machine is either sold outright or rented, as the contractor or municipality may desire. The value and superiority of these trench machines are well known to the readers of the MUNICIPAL JOURNAL AND ENGINEER. Their efficiency is being demonstrated in all parts of the United States—and has been for many years—as they are employed in making all kinds of excavations. The contractors who infringed upon the patents of the Potter Manufacturing Company recognized the validity of the patents, but thought to secretly trespass upon the rights of the patentees. The Potter Manufacturing Company is to be congratulated upon winning its case.

A Remarkable Street Cleansing Machine

The accompanying illustration shows how St. Louis cleans its streets. The machines are at work on Third street, which is the habitat of the produce wagon and the retail produce hand wagon. As a result, this street receives a larger variety of filth in a shorter space of time than any other street in St. Louis. Formerly, a large force of "White Wings," or street cleaners, were kept strenuously busy in an endeavor to make this street habitable, even for those

A STREET CLEANING MACHINE THAT CLEANS

whose olfactory nerves had become accustomed to the miscellaneous smells emanating from decaying vegetables, fruits, etc. Despite the efforts of the "White Wings" this street had never been really clean in the memory of the "oldest inhabitant." Two trips of the sanitary street cleansing and sprinkling machines, with their tremendous pressure, served to remove the filth of years. Thereafter only one trip was found necessary—after the departure of the morning wagons—to keep this street as neat and trim as a boulevard. As will be seen by a glance at the picture, the garbage and filth are driven into the gutter and made ready for removal by the garbage collector. Catalogue and price list can be secured by addressing the Sanitary Street Cleansing and Sprinkling Machine Company, St. Louis, Mo.

Modernizing a Trunk Line

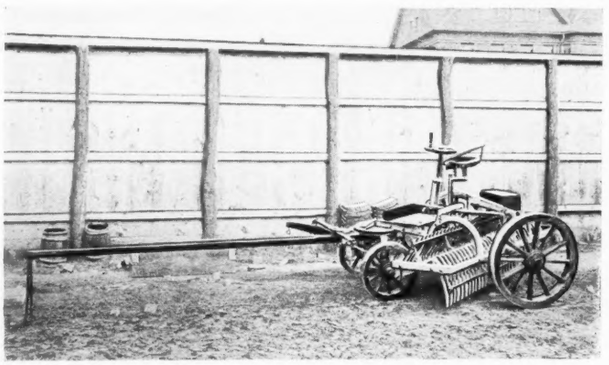
When the Delaware, Lackawanna & Western Railroad was first constructed, back in the '80's, it was built better than any road in America. Had there been no improvements since that date it would now be in the rear of the procession of the great trunk line railroads in the country, but its management has remembered well the fact that a trunk line can keep abreast of the times only by constant improvements. The usefulness of this famous trunk line was greatly enhanced, and the convenience and comfort of its patrons increased when the present management took charge of the road in 1899. Although President Truesdale was confronted with the problem of decreasing the transportation cost, the adoption of modern methods and improved devices for maintaining the property, the necessity for rebuilding bridges, replacing old stations with new, reducing many of the grades and curves, elevating the tracks through various cities and the making of numerous other improvements, he planned so wisely and handled the forces at his command so discreetly that the road soon came to enjoy greater prosperity than ever.

Now that vacation time is drawing near, city officials will begin to plan for their play days. If they wish to enjoy a delightful trip, one filled with ease and comfort while traveling, at the same time affording some of the most admirable scenic views to be found in the United States, it would be well to correspond with T. W. Lee, General Passenger Agent of the Delaware, Lackawanna & Western Railroad, 26 Exchange Place, New York City.

NEW D. L. & W. R. R. STATION, BINGHAMTON, N. Y.

An Efficient Pavement Scraper

The Bureau of Highways of Greater New York is equipping a road repair plant and the accompanying illustration shows one of the useful machines that is doing good service. It is a scraper for cleaning macadam roads, being used mainly in the suburbs. Regarding the efficiency of the machine, Mr. E. J. Fort, Assistant Engineer in the



THE OASTLER MACADAM ROAD SCRAPER

Bureau of Highways of Brooklyn Borough, says: "I wish to state that they have not been used long enough to give us exact data as to their value measured in units of men, but we have learned that for the purposes for which they are designed, viz., cleaning macadam streets or cleaning quantities of earth or sand from stone pavements they are very efficient. In two trials that we made of them we cleaned a roadway paved with cobblestone, twenty-four feet wide and 700 feet long in forty minutes, so that the earth was left piled ready for loading and removing. Of course, the street sweeping machine followed the scraper in order to properly clean the street. To do this amount of work would have required not less than ten men working one-half day, perhaps they would not have done it in a half day. In the same way, working on macadam streets, we have found that we can remove the surplus material from the surface much better than men can do with hoes, and without hesitation I should say that the machine would do the work of twelve or fifteen men, perhaps twenty men, without great effort. Occasionally it loosens a stone in stone pavements, when a sharp point or edge projects above the surface. Perhaps one or two cobblestones on a block would be removed. Of course, in cleaning stone pavements we drive rather slowly, so that as few stones as possible will be removed. It does not tear out any macadam at all on macadam streets. Altogether it seems to be very well designed for its work." For particulars address Wm. C. Oastler, 156 Fifth Avenue, New York.

NOTES OF INTEREST TO THE TRADE

—The Buffalo Meter Company moved into its new factory building May 1, and its new address will be 290 Terrace, Buffalo, N. Y.

—In a plant recently installed in the South by the Pneumatic Engineering Company, 128 Broadway, New York, the air lift system pumps nine million gallons of water per day from four 10-inch wells.

—The city of Cleveland, O., has purchased eighteen of the Oastler "American Barnard Castle" street sweeping machines. This order was secured against the strong competition of other manufacturers.

—The offices of the Masurite Explosive Company have been transferred from 50 Broadway, New York, to Masury, Ohio. Their Post Office address in the future will be Lock Box 144, Sharon, Pa.

—The Rand Drill Company reports the removal of its San Francisco office from 223 First street to the Rialto Building, additional space being needed because of the rapidly expanding business of this company.

—The Vulcan Iron Works, of Chicago, have just issued a new catalogue—No. 23—which tells all about the pile driving machinery it manufactures. Price list will be sent with the catalogue when requested.

—The New York Tax Reform Association, formerly located at 111 Broadway, has removed its offices to the new Kuhn-Loeb Building, corner William and Pine streets. The new mail address will be 52 William street. Lawson Purdy, Esq., is the secretary of this association.

—The Eureka Fire Hose Company is building an addition to its factory in Jersey City that will be devoted to the twisting and weaving departments. The extension is about 118 x 50 feet, with four floors, and will make the total area of the company's main factory about three acres. The machinery to be installed will be electrically driven.

—A Bureau of Expert Investigation and Construction has recently been organized, with general offices at 35 Nassau street, New York, and James Blake Cahoon is Director. The work of this Bureau will cover the electrical, mechanical, hydraulic, civil and mining engineering fields, besides including the services of an eminent chemist and expert attorneys who will deal with patents and patent laws.

—The Otis Elevator Company will relinquish its extensive suite of offices in the Empire Building, New York, although its lease has still some time to run, and move to the Whitehall Building, facing Battery Park, because of the impossibility of procuring additional accommodations in the former building and of the absolute necessity for increased office facilities.

—The contract for the furnishing of labor, materials and plant for the construction of the creo-resinate wood block pavement for the roadways of the new East River Bridge, connecting Manhattan and Brooklyn, was recently awarded to the United States Wood Preserving Company, 29 Broadway, New York, of which Mr. F. A. Kummer is the Treasurer and General Manager.

—Mr. Phil. C. Clark will hereafter represent the Eureka Fire Hose Company in the States of Texas and Louisiana and Indian and Oklahoma Territories. His future address will be 820 Perdido street, New Orleans, La. Mr. Clark is an ex-fireman and a veteran of the civil war. He has been in the hose business long enough to see the passing of leather and rubber fire hose and the substitution of cotton, rubber lined fire hose.

—The Lake Shore and Michigan Southern Railway has recently issued an attractive folder, describing how a delightful trip may be made either by boat or rail between Cleveland and Buffalo. It announces that it is the privilege of any patron to travel by rail or steamer between the above mentioned points, either way, without extra cost. Full particulars may be secured by addressing A. J. Smith, General Passenger Ticket Agent, Cleveland, O.

—The constantly increasing demand for the Christensen Air Brake and "Ceco" electrical machinery has made a necessary change in the organization of the company. To accomplish this result the owners of the stock of this company have organized the National Electric Company, and the assets, goodwill, etc., of this company were transferred on May 16, 1903, to the National Electric Company. The purposes, ownership, management and control of the new company are identical with those of the old.

CONTRACT NEWS FOR THE MONTH

Including Paving, Sewerage, Water Supply, Lighting, Public Buildings, Sewage and Garbage Disposal, Fire Supplies, Contracts Awarded

N. B.—All news of proposed work sent us by city officials is incorporated in our Weekly Advance News Service and appears subsequently in this "Contract News for the Month" if the date of the reception of bids be sufficiently late to warrant placing the item here.

City officials and others are urged to send us all news of contemplated improvements for use in our Weekly Bulletins which are mailed to those interested.

PAVING

Albany, N. Y.—Bids will soon be asked for good roads work to cost $1,000,000.

Albany, N. Y.—Part of Delaware street will be paved.

Amherst, Mass.—$20,000 will be spent on the road to Northampton.

Anderson, Ind.—$25,000 worth of bonds have been voted for street purposes.

Astoria, Ore.—Fourth street will be macadamized.

Augusta, Ga.—The paving of Broad street is under consideration.

Augusta, Me.—$40,000 has been appropriated for highways.

Baltimore, Md.—Joppa road will be improved.

Baltimore, Md.—Belgian block will be laid on Conway street.

Belleville, Ill.—West Main street will be paved.

Berkeley, Cal.—Louisa street will be macadamized.

Boise, Idaho.—The road to Thunder Mountain will be improved, for which $20,000 has been appropriated.

Boston, Mass.—A boulevard one mile in length will be constructed at an expense of $2,000,000.

Brookline, Mass.—Harvard street will be widened at an expense of $50,000.

Brownwood, Tex.—A vote will be taken on the question of issuing $50,000 worth of bonds.

Buffalo, N. Y.—The paving of ten streets is under consideration. Com. of Public Works.

Buffalo, N. Y.—Medina sandstone on two streets is being considered.

Burlington, Ia.—Cement walks have been ordered for all the streets leading into the city.

Butler, Pa.—This place contemplates the laying of concrete curbing.

Butte, Mont.—It is probable that $75,000 will be spent on the West Side streets.

Cambridge, Mass.—Monroe street will be completed at a cost of $10,000.

Canandaigua, N. Y.—$151,950 will be spent to pave Main street with brick.

Carleton County, Ont.—$270,000 will be expended on good roads.

Cardington, O.—The improvement of Marion Pike has been petitioned.

Celina, O.—Walnut street will be paved.

Charlevoix, Mich.—George S. Pierson, C. E., of Kalamazoo, is preparing plans for the paving of Bridge street.

Chelmsford, Mass.—Lowell street will be widened.

Chicago, Ill.—State street will be paved with asphalt at a cost of $25,000; 43d street may also be asphalted. Board Local Improvement.

Chicopee, Mass.—Chicopee street will be paved, $2,500 being available for the purpose.

Cohoes, N. Y.—The pavement of several streets is being considered.

Colfax, W. Va.—The Colfax Brick Company has been incorporated with a capital of $50,000, for the purpose of manufacturing clay products.

Concord, N. H.—An appropriation of $9,000 has been made for streets.

Crawfordsville, Ind.—Paving to the amount of $39,000 has been planned.

Dallas, Tex.—Good roads bonds will be issued to the amount of $500,000.

Davenport, Ia.—The sum of $17,000 will be spent on macadam roads.

Delray, Mich.—The paving of River street with brick is being considered.

Fairview, Mich.—Paving to the amount of $125,000 will be laid.

Fayetteville, N. C.—This place voted May 4th on $40,000 bonds for road improvement. County Clerk.

Elyria, O.—The paving of three different streets with asphalt and brick is being considered.

Fort Wayne, Ind.—60,000 square yards of paving will be laid this season.

Fredericksburg, Va.—This place is considering the improvement of the highways of Stafford County.

Fredericksburg, Va.—Spottsylvania County will issue $100,000 bonds for macadamizing roads.

Gainesville, Fla.—Some of the streets here will be paved. City Clerk.

Galveston, Tex.—Estimates for paving have been prepared. City Engineer.

Grand Rapids, Mich.—$150,000 worth of paving will be done this season.

Jackson, Tenn.—Madison County will spend $150,000 for gravel roads.

Jackson, Tenn.—$150,000 worth of bonds have been voted for road improvement.

Johnson City, Tenn.—C. E. Ellsworth, Chairman of the Finance Committee, wrote that the city will vote May 26th on $25,000 improvement bonds.

Kansas City, Mo.—Three country roads will be macadamized.

Lawrence, Mass.—The purchase of a stone crusher is contemplated.

Liverpool, O.—The paving of Lisbon street is under consideration.

Lowell, Mass.—$65,000 worth of bonds have been voted for streets.

Lynchburg, Va.—It is reported that Campbell County may issue $200,000 in bonds for the macadamizing of roads.

Lawrence, Kan.—The roads will be improved to the amount of $50,000.

Lyons, N. Y.—The paving of Phelps street has been petitioned.

Madison, Ky.—$150,000 in bonds will be issued for road improvement. A. M. Alexander, Chairman County Commissioners.

Madisonville, O.—Street improvement bonds were offered for sale on May 25.

Manchester, N. H.—The contractors for macadamizing of West 6th avenue need a stone crusher, the one now being used having proved useless.

Marysville, O.—16,500 square yards of paving on Main street has been petitioned. Mayor Hamilton.

Milford, Del.—A vote will be taken on the question of issuing $20,000 in bonds to improve the water, light and street facilities.

Mill Valley, Cal.—The citizens will vote on the issuing of $50,000 in road and sewer bonds.

Minneapolis, Minn.—The city will issue $112,000 bonds for the paving of six streets, and repair Park avenue with asphalt at $3,500.

Mobile, Ala.—A good share of the city will be paved with granite and brick. Board of Public Works.

Montreal, Que.—$220,000 will be spent on streets and walks.

New Albany, Ind.—Thirteen miles of asphalt will be laid.

Newcastle, Ind.—Consideration is being given to the proper paving material.

New Haven, Conn.—$50,000 worth of paving bonds have been sold.

New Orleans, La.—Ten streets will be paved with asphalt, for which $468,000 has been appropriated.

Newport News, Va.—Warwick County will vote on $35,000 bond issue for road and bridge improvements.

Norfolk, Va.—$22,000 will be spent on the improvement of several streets.

Norfolk, Va.—Bids are wanted for $100,000 worth of bonds for paving and grading.

Oakland, Cal.—Mayor Olney recommends that the streets be paved and put in good condidtion.

Olive Hill, Ky.—The Reece-Hammond Brick Co., of Bolivar, Pa., will build a brick plant near Oliver Hill.

Oshkosh, Wis.—Main, Jackson street and Franklin avenue will be asphalted.

Payette, Idaho.—The Payette Improvement Co. will spend $121,000 on 24 miles of roads.

Pensacola, Fla.—An election will be held July 2nd to vote on issuing $200,000 in bonds for paving purposes.

Perry, N. Y.—$15,000 in bonds have been voted for improving the streets.

Plymouth, Mass.—$3,000 for walks and $16,000 for roads has been recommended.

Providence, R. I.—$100,000 will be spent on good roads.

Reading, Pa.—Brick paving on 25 blocks is being considered, the cost of which is estimated at $100,000.

Riverside, Cal.—$50,000 in bonds may be issued.

Rochester, N. Y.—$39,000 may be spent for macadamizing two streets.

San Francisco, Cal.—Street paving to the amount of $379,000 will probably be laid.

Seattle, Wash.—The Street Commissioner has recommended that Broadway be paved with asphalt. The cost of paving First avenue is placed at $55,000.

Seneca Falls, N. Y.—One and one-third miles of road to Waterloo will be macadamized at a cost of $11,000.

Shreveport, La.—$533,000 is the estimated cost of nine miles of asphalt.

St. Louis, Mo.—Road bonds to the amount of $250,000 will be issued.

Springfield, Ill.—The paving of North Grand avenue has been recommended.

Superior, Wis.—Broadway and Ogden avenue may be paved with asphalt.

Superior, Wis.—The paving of several streets is being considered.

Syracuse, N. Y.—Bids were asked on May 5th for $171,000 in bonds for local improvements.

Tacoma, Wash.—Twenty-eight miles of cement walks will be laid and three streets will be paved.

Terre Haute, Ind.—Eighth street may be improved and Lafayette avenue will doubtless be paved.

Walla Walla, Wash.—Two streets will be paved. City Clerk Reynolds.

Warsaw, Ind.—Brick has been favored for the proposed paving.

Thornton, W. Va.—A brick plant to cost $25,000 will be built.

Vincennes, Ind.—Two miles of brick will be laid.

Waverly, N. Y.—It has been voted to pave Chemung street with brick.

Westfield, Mass.—$25,000 will be spent in improving the highways.

Westfield, Mass.—The cost of asphalt pavement for Park Square is placed at $25,700; with brick, $22,500, and macadam, $7,000.

Winchester, Ind.—Brick pavement is being considered.

Windsor, Ont.—The City Council will vote on $27,000 for road improvements.

Winnipeg, Manitoba.—$15,000 will be spent in improving McMillan avenue with asphalt.

Woodbury, N. J.—The issue of $6,000 in bonds is contemplated for street improvement.

Youngstown, O.—A resolution has passed the city council to construct sidewalks on sundry streets.

Youngstown, O.—The paving of Marion avenue has been petitioned.

Contracts Awarded

Anderson, Ind.—J. J. Netterville and C. H. Daniels have been awarded the contract for paving Third street, as well as two others, with brick, for five miles with Metropolitan Block at $1.51 to $1.54 per square yard.

Atchison, Kan.—The contract for brick on sand on 11th street has been let at 86 cents, and for cement curb at 40 cents.

Ballard, Wash.—The lowest bid for paving Ballard avenue has been received from T. Ryan & Co.

Boston, Mass.—The contract for a macadam road in Columbia Road, So. Boston District, has been let Harry P. Nawm, of Boston.

Buffalo, N. Y.—The contract for paving Lord street with brick has been let L. H. Giff Company at $14,170. Kingston Place, with brick, to F. V. C. Bordol at $3,750.

Celina, O.—The contract for paving E. Livingston street has been let Keller Bros.

Cincinnati, O.—The contract to improve Calhoun street has been awarded the Kirchner Construction Company. The contract for paving Hatch street with brick has been let E. Evans at $8,443.

Duluth, Minn.—The contract for paving 2nd avenue has been let P. McDonnell at $13,255.

Erie, Pa.—The contract for Mack brick pavement on German street has been awarded to F. P. Coyle at $1.60 per yard. For Medina stone on Front street to Peter J. Wissler at 96 cents per yard.

Evanston, Ill.—The contract for macadamizing Dempter street has been awarded M. Foley at $15,500.

Everett, Wash.—The contract for two miles of Marsh road has been let to A. C. Goerig at $2,000.

Florence, Neb.—The contract for paving Florence Boulevard has been let E. D. VanCourt & Winn Co. at $12,000.

Freeport, Ill.—The contract for macadamizing on eight streets has been awarded G. Maffioli.

Glenville, O.—The contract for asphalt on St. Clair street has been awarded the Cleveland-Trinidad Co.

Harrisburg, Pa.—The contract for sheet asphalt on Second street has been awarded the Warner-Quinlan Co.

Haverhill, Mass.—The contract for the Amesbury Road has been let the Lane Construction Company.

Jersey City, N. J.—The contract for paving Harrison avenue has been awarded to the Uvalde Asphalt Paving Co. For improving Delaware avenue and Union street to John Nolan.

Jersey City, N. J.—John Nolan has received the contract for improving Wilkinson avenue and five other streets.

Jersey City, N. J.—The contract for fire brick, clay and cement has been let to Washburn Brothers & Co.

Linton, Ind.—W. D. Horton & Co., of Terre Haute, have received the contract for twelve miles of street paving.

McKeesport, Pa.—The contract for paving Fifth street has been let to Charles F. Ott.

Morristown, N. J.—The contracts for roads were awarded as follows: J. B. & H. K. Salmon, Lidgewood; Dickerson & Gill, Rockaway, and W. J. & A. G. Bunn, Sincag.

Napoleon, O.—Contracts for roads have been let John Ranius & John Ryan.

Newburg, N. Y.—The contract for paving on Broadway has been let the Russell Contracting Company, New York.

New London, Conn.—The contract for paving on Cedar street has been awarded to C. Blakeslee & Son for $4,135.

Pasadena, Cal.—The Fairchilds-Gilmore, Wilton Company has been awarded the contract for paving No. Fair Oaks avenue.

Rochester, N. Y.—The following contracts have been awarded: Rhine street, brick improvement, to N. H. Cowles, $8,137; Sauer Place, cement walks, to Whitemore, Rauber & Vincennes, $1.76; Gregory street, cement walks, to H. B. Hooker & Son, $1,350; Thona Place, cement walks, Repton & Murphy, 78 cents.

Salem, O.—G. D. Smith has received the contract for brick and asphalt paving at $30,000.

South Hadley, Mass.—The contract for part of state road has been let Coles & Childs, of Amherst, at $14,000.

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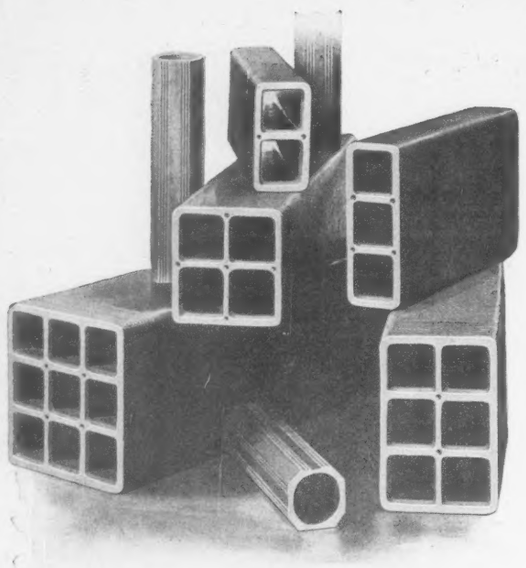
THE H. B. CAMP CO.

MANUFACTURERS OF

Vitrified Clay Conduit



Single and Multiple Duct

Six large factories in active operation enable us to make prompt shipments.

Estimates furnished for Complete Underground Conduit Installation, Under H. B. Camp Patents.

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170 Broadway, New York.

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Address Dept. G. when writing.

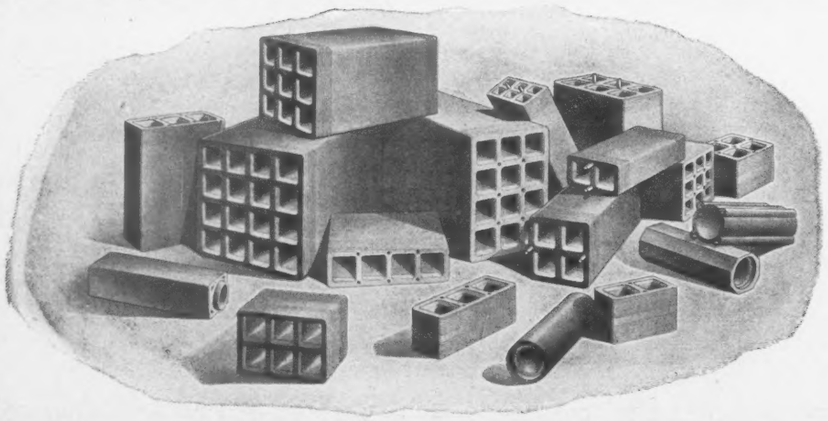
R. W. LYLE, President and General Manager — *B. S. BARNARD, Vice-President and Secretary*

STANDARD VITRIFIED CONDUIT COMPANY

General Offices, 39-41 Cortlandt Street, New York

Vitrified, Salt Glazed Underground Conduits and Insulators

We have ample facilities for producing superior Salt Glazed Vitrified Conduit with newly patented interlocking features. Many years' experience in the manufacture and installation of Electrical Underground Conduits for largest underground systems in the world.



CONDUITS

Multiple or Single Duct

VITRIFIED---GLAZED

Contractors for Subway Installations

AMERICAN VITRIFIED CONDUIT COMPANY

Broadway, Maiden Lane Building, New York

Springfield, Mass.—Coles & Childs, Amherst, have received the contract for state road at $14,000.

Tacoma, Wash.—George M. Savage & Co. has received the contract for cement walks.

Terre Haute, Ind.—The contract for improving Chase street has been let to L. F. Purdue for $4,894.

Toledo, O.—Contracts have been let H. G. Jennison, for $21,420, to pave East Broadway with Harris pavers, and John street to C. H. Bodette for $1,142.55.

Toledo, O.—Contract has been let H. G. Jennison for paving Starr avenue with Harris pavers.

Topeka, Kan.—Contracts for paving have been let Ramsey & Ramsey, 31,500 square yards; Wall & Hanley, 22,000 square yards; J. H. Maxwell, 60,000 cubic yards grading.

Waterloo, Ia.—The contract has been let William Harrabin, of Iowa City, for paving, 90,000 square yards of Flint brick, at $1.36 per square yard.

White Plains, N. Y.—The contract for 25 miles of road in Yorktown, Somers, etc., have been awarded.

Youngstown, O.—The contract for paving Wood street and Yale avenue has been awarded to the Cleveland Trinidad Paving Co.

PUBLIC BUILDINGS

Albany, Ky.—A new court house will be built, for which $10,000 in bonds will be issued.

Ashland, Wis.—This place has under consideration the building of a high school on Ellis avenue, to cost $75,000.

Athens, Ga.—According to reports a city hall will be erected here.

Atlanta, Ga.—A new engine house will be built at a cost of $10,000. The Mayor.

Baker City, Ore.—A new city hall will be built at this place at a cost of $45,000.

Beaumont, Tex.—A high school to cost $65,000 is contemplated here.

Berwick, Pa.—An appropriation of $60,000 has been made for a city hall and improvements to the sewers.

Birmingham, Ala.—Plans for the new court house were prepared.

Bismarck, N. D.—An addition to the capitol to cost $100,000 is under consideration.

Brownwood, Tex.—A Carnegie library will be built here. Will H. Hayes, Sec'y.

Calais, Me.—A public building is being considered at this place.

Cedar Falls, Ia.—Plans for the $75,000 court house are now ready.

Cleveland, O.—Bids are wanted June 8 for a post office, custom house and court house. J. K. Taylor, Treasury Dept., Washington, D. C.

Cordele, Ga.—On June 2 a vote will be taken on a $15,000 bond issue for a new school. Mayor Wilson.

Crawfordsville, Ga.—The erection of a $40,000 court house is being discussed.

Dobbs Ferry, N. Y.—A new court house is under consideration here.

Durant, I. T.—$15,000 in bonds have been issued for a new school. W. T. Whitlach, president, School Board.

Erie, Kan.—A new court house will be erected.

Flushing, N. Y.—A new armory for the 17th Separate Company is desired, for which it is expected $50,000 will be spent.

Fon du Lac, Wis.—$60,000 in bonds will be issued for a library.

Goshen, Ind.—The court house will be improved at an expense of $40,000.

Greencastle, Ind.—Plans for a new court house are now being selected.

Greensboro, N. C.—Plans for a government building to cost $65,000 have been approved.

Greenwich, Conn.—Will build a large fire house. Borough Clerk Minor.

Harrisburg, Pa.—A new school in the 8th Ward is under consideration.

Holly, N. Y.—A house for firemen will be built at this place.

Huntsville, Tenn.—Reports state that a new court house is being discussed.

LaGrange, Ga.—Bids are wanted July 13th for a court house. Com. of Roads and Revenues.

Lakewood, O.—$75,000 in bonds will be issued for school purposes.

Louisville, Ga.—A $30,000 court house is under consideration here.

Lynchburg, Va.—An appropriation of $50,000 has been made for building cells at the penitentiary.

Madison, Wis.—The expenditure of $500,000 for a new court house for the Supreme Court is talked of.

Marshalltown, Ia.—The Mayor recommends a new city hall for this place.

Marlboro, Mass.—$75,000 will be spent in rebuilding the city hall.

McSherrystown, Pa.—A new fireman's hall will be built.

Milwaukee, Wis.—A $100,000 court house is being planned for Manitowoc County. Board of Supervisors.

Minneapolis, Minn.—A new police station is talked of.

Minneapolis, Minn.—$150,000 in bonds will be issued for an auditorium.

Newark, N. J.—This place will appropriate $25,000 for an armory.

New Albany, Ind.—Bids will soon be asked for a $75,000 high school on 6th street.

New Orleans, La.—$400,000 will be spent on a court house. City Engineer Harde.

New York, N. Y.—Plans are now ready for the $90,000 police station in Greenpoint, for the 75th Precinct.

Norfolk, Va.—Bids will soon be asked for a $50,000 Carnegie library.

Owasso, Mich.—This place will build a new court house at a cost of $75,000.

Pensacola, Fla.—Will vote July 2 on $50,000 worth of bonds for a city hall.

Petersburg, Ind.—A petition has been made for a court house to cost $100,000.

(Continued on page 26.)

SAFETY
DANGER
NO MORE
from premature explosions is assured in all Mining, Engineering or Blasting Operations, if you'll use the New and Powerful Explosive
MASURITE
There is no known method of exploding it, except by means of a "double strength cap or electrical exploder. Percussion, Friction, Fire, Electricity, or Shock have no effect on it. No noxious fumes with MASURITE to keep miners or laborers away after the charge has been exploded. It saves time, and time means money. For booklet, prices and full information about MASURITE address
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SAFE TO HANDLE IN ALL RESPECTS
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Notice to Contractors.—Highway Improvement

State of New York, Office of the State Engineer and Surveyor. Albany, N. Y.

Pursuant to chapter 115 of the Laws of 1898, sealed proposals will be received by the undersigned, at his office in the State Hall, at Albany, N. Y., on Monday, the 8th day of June, 1903, at twelve o'clock noon, for the improvement of public highways, as follows:

No. 72—Catskill Road, Tompkins county, length 1.869 miles.
No. 126—Town Line Extension Road, Broome county, 1.970 miles
No. 127—Park Bridge Road, Broome county, length 2.040 miles.
No. 128—Aurora-Buffalo Road, Erie County, length 5.573 miles.
No. 129—River Road, Sec. 2-3, Erie county, length 3.015 miles.
No. 130—Main Street Road, Sec. 4, Erie County, length 5.625 miles.
No. 131—Main Street Road, Sec. 5, Erie County, length 6.581 miles.
No. 132—Genesee Turnpike, Onondaga county, length 1.130 miles.
No. 133.—Little Falls-Dolgeville Road, Herkimer county, 2.290 miles.
No. 134—Fenton Road, Broome county, length 2.170 miles.
No. 135—Violet Avenue Road, Dutchess county, length 3.290 miles.
No. 136—Windsor Road, Sec. 2, Clinton county, length 1.750 miles.
No. 137—Plattsburg-Keeseville, Sec. 2, Clinton county, 4,520 miles.
No. 138—Plattsburg-Mooers, Sec. 1, Clinton county, 7,570 miles.
No. 139—Hamilton Bridge Road, Oneida county, length 1.290 miles.
No. 140—Seneca Turnpike, Oneida county, length 2.280 miles.

Sealed proposals will also be received by the undersigned at his office in the State Hall at Albany, N. Y., on Wednesday, the 10th day of June, 190, at twelve o'clock noon, for the improvement of public highways, as follows:

No. 141—Kingston-Ellenville, Sec. 3, Ulster county, 6.820 miles.
No. 142—Saugerties-Woodstock, Sec. 3, Ulster county, 2.850 miles.
No. 143—Echo Lake-Pine Bridge, Westchester county, 3.140 miles.
No. 144—Bedford-Cross River, Westchester county, 5.230 miles.
No. 145—Delaware River Road, Delaware county, length 1 mile.
No. 146—Geneva-Canandaigua Road, Ontario county, 5.624 miles.
No. 147—Burr's Mills Road, Jefferson county, 3.920 miles.
No. 148—Pine Bridge-Yorktown Heights, Westchester county, 3.490 miles.
No. 149—Yorktown Heights-Putnam county Line, Westchester county, 6.620 miles.
No. 150—Cross River-Turk Hill, Westchester county, 3.460 miles.
No. 151—Turk Hill-Putnam county Line, Westchester county, length 5.520 miles.
No. 152—Fonda, East, Montgomery county, length 2.500 miles.
No. 153—Newburg-Campbell Hall, Orange county, length 13.380 miles.
No. 154—Chester-Vails Gate, Orange county, length 11.490 miles.
No. 155—Fonda, West, Montgomery county, length 2.500 miles.
No. 156—Chester-Goshen Road, Orange county, length 3.530 miles.

Plans and specifications for all of the above work may be seen at the office of the undersigned. They may also be seen for all roads in the counties of Herkimer, Dutchess, Clinton, Ulster, Westchester, Delaware, Montgomery, and Orange at the office of H. A. Van Alstyne, Division Engineer, State Hall, Albany, N. Y.; for the counties of Tompkins, Broome, Onondaga, Oneida and Jefferson, at the office of H. H. Gere, Division Engineer, Weighlock, Syracuse, N. Y.; for the counties of Erie and Ontario, at the office of A. J. Rockwood, Division Engineer, Triangle Building, Rochester, N. Y. Plans and specifications for the roads within each of the following counties may be seen at the office of the County Clerk of the county within which each road is located, respectively; Tompkins, Herkimer, Dutchess, Delaware, Montgomery and Jefferson, and at the office of the Clerk of the Board of Supervisors of the county within which each road is located, respectively: Broome, Erie, Onondaga, Clinton, Oneida, Ulster, Westchester, Ontario and Orange.

The attention of bidders is called to the fact that the following roads are in such close proximity to each other that they can be economically managed by the same contractor: Nos. 126, 127 and 134; Nos. 130 and 131; Nos. 139 and 140; Nos. 152 and 155; Nos. 143, 148 and 149; Nos. 144, 150 and 151.

Proposals must be made for the completion of each road for a lump sum in accordance with plans and specifications. Each proposal must be accompanied by New York draft or certified check payable at sight to the order of the State Engineer and Surveyor for five per cent. of the proposal. Such draft or check will be held until the execution of the contract. The successful bidder must give a bond executed by a surety company approved by the undersigned and in amount not to be less than fifty per cent. of the contract price. Attention is called to the fact that ninety per cent. monthly payments will be made instead of seventy-five per cent., as formerly.

Proposals for each road must be presented in a separate sealed envelope endorsed on the outside with the number and name of the road for which the proposal is made.

Specifications, bidding sheets and form of contract may be had on application to the undersigned or to the Division Engineers above mentioned.

The right is reserved to reject any and all bids.

May, 1903.

EDWARD A. BOND,
State Engineer and Surveyor.

FOR SALE.

This City has a large number of second-hand square gas lamps, for street lighting, for sale cheap. Correspondence solicited.

B. E. BRIGGS, City Engineer,
ERIE, PA.

Notice to Water Works Contractors

SEALED proposals, endorsed proposals for pipe laying and addressed to George J. Smith, City Clerk of the City of North Tonawanda, N. Y., will be received and opened at 8 o'clock P. M., on June 15, 1903. The work will comprise a 24-inch cast iron force main, laid from the pumping station to Main Street, the river crossing will be laid with 24-inch flexible cast iron pipe. A certified check of $2,000.00, made payable to the order of Charles Kohler, City Treasurer of the City of North Tonawanda, N. Y., must accompany each proposal, as a guarantee that the contract will be executed and bond filed as provided for in the specifications. Plans and specifications are on file in the office of the City Clerk, where they may be examined and forms for proposals obtained. The city reserves the right to reject any or all bids.

City of North Tonawanda, N. Y., May 16, 1903.

JOHN KAISER,
President of Board of Public Works.

Pumping Plant and Improvement to Water Supply

Water Commissioner's Office, Schenectady, N. Y., May 12, 1903.

SEALED proposals will be received up to twelve (12) o'clock, noon, of Monday, June 8, 1903, for furnishing and erecting one pumping engine and two tubular boilers at the Rotterdam pumping station.

Also for erecting an engine room, constructing a collecting gallery, erecting a stand pipe and foundation for same, and laying a thirty-six (36) inch cast iron or steel riveted force main.

Forms of proposals showing in detail the manner and conditions under which tenders for the above mentioned work will be received, together with specifications, drawings and estimate may be obtained at the Water Commissioners' office, No. 447 Franklin Street.

HON. H. S. VAN VOAST,
CHARLES E. LUCKHURST,
ALONZO PETERS,
JOHN J. MOFFETT,
HERMAN URY,
Water Commissioners.

WANTED—Hook and Ladder Truck with Chemical Engine Combined. Address J. B. STUCKEY, Mayor, Sumter, S. C.

Pittsfield, Mass.—A $50,000 school on Orchard street is being talked of.

Plainfield, N. J.—Will build a $125,000 high school.

Princeton, Ind.—Plans for a Carnegie library are being prepared. Library Committee.

Redwood City, Cal.—The plans for the $125,000 court house have been accepted. Board of Supervisors.

San Francisco, Cal.—Report states that seventeen schools will be erected.

Seattle, Wash.—A new court house will be built.

Sealy, Tex.—$10,000 worth of bonds will be issued for a new school. Mayor.

Selma, Ala.—A government building to cost $75,000 may be erected.

Spokane, Wash.—$50,000 has been donated for a Carnegie library.

Superior, Wis.—A new jail will be built here.

Terre Haute, Ind.—Bids will soon be asked for a Manual Training School to cost $50,000.

Walla Walla, Wash.—Plans for a $50,000 high school will be prepared.

Washington, Ind.—A new site for a city hall is being looked for. Mayor Clark.

Webster, Mass.—Plans for a $60,000 high school will be asked. Chairman School Committee.

Wenham, Mass.—$15,000 have been voted for a school on Cherry street.

Wheeling, W. Va.—Bids for the high school have been rejected as too high. The cost is placed at $45,000.

Winchester, Ky.—A new court house will be built at a cost of $40,000.

CONTRACTS AWARDED

Birmingham, Ala.—The contract for the new school has been let to Talliaferro & Alfred for $12,000.

Caldwell, Tex.—W. B. Silliman has received the contract for the new school at $8,150.

Cambridge, Md.—J. B. Brown has received the contract for the United Charities Hospital at $40,000.

Des Moines, Ia.—The contract for the City Library has been let James Rawson & Son, Iowa City, at $56,860. Library Board.

Lancaster, Pa.—Contract for completing the general hospital has been let G. S. Flick at $50,000.

Monroeville, Ala.—The contract for building the court house has been let M. T. Lewman & Co., of Louisville, Ky.

Moundsville, W. Va.—The contract for cells in the penitentiary has been let The Van Dorn Iron Co. of Cleveland, O., at $48,000, and Dickson, Beardsley & Foreman, of Marietta, O., at $20,000.

Norfolk, Va.—Contract for a school has been let Dear & Brown at $24,464.

Oakland, Cal.—The contract for buildings at Fort Wright has been let A. W. Burrell at $54,506.

Orange, Tex.—H. Koerner, of Beaumont, has received the contract for a new high eschool at $15,000.

Pasadena, Cal.—The contract for a high school on North Euclid avenue has been let to J. F. Atkinson at $75,000.

Selma, Ala.—The contract for a city hall, market house and armory has been let to P. L. Manly, of Birmingham, for $25,000.

Spokane, Wash.—The contract for buildings at Fort Worden has been let Hastie & Dougan at $71,000.

Texarkana, Ark.—Messrs. Bryant & Brown have received the contract for a new jail at $40,000.

Wadesboro, N. C.—The contract for a new dormitory for the Pee Dee Institute has been let W. T. Brossington.

Washington, D. C.—The contract for a new hospital has been let Richardson & Burgess for $62,085.

SEWERAGE

Abilene, Kan.—A sewer system will be built here.

Allentown, Pa.—A private company wishes to put in a sewer system.

Anderson, Ind.—City Engineer Roberts will prepare plans for Green's branch.

Atlanta, Ga.—24,300 feet of sewers will be built.

Augusta, Ga.—This city will lay a 12 to 20-inch pipe sewer on Market street and a 10 to 12-inch one on Dugas street.

Baker City, Ore.—This place will build a sewer system.

Baldwinsville, N. Y.—A sewer system to cost $50,000 is being planned.

Ballard, Wash.—$40,000 will be spent for the sewer system in 2nd avenue.

Ballard, Wash.—Plans for sewers are being prepared.

Bangor, Me.—$10,000 will be expended on extending the West Bangor intercepting sewer.

Beverly, Mass.—Bonds will be issued for sewer purposes.

Buffalo, N. Y.—A 10 to 12-inch sewer will be placed in Kenmore avenue.

Buffalo, N. Y.—A 4 x 6 feet sewer will be built in Hopkins and two other streets.

Cambridge, Mass.—9,980 feet of sewers will be built. Sewer Com.

Canton, O.—Sewers in two streets will be built. City Clerk Lloyd.

Cincinnati, O.—Plans are now ready for the sewer in Fairmont avenue.

Cleveland, O.—A sewer in Margan Valley Run will be built. City Engineer. Chase.

Clinton, Ia.—Plans for the sewer system have been prepared. City Engineer

Colorado Springs, Col.—Plans have been prepared for five miles of sewers. City Engineer Case.

Columbus, O.—A 8 to 27-inch sewer will be built here. City Engineer.

Cortland, N. Y.—A large amount of sewerage has been petitioned for.

Coon Rapids, Ia.—A sewer system will be built here.

Cuba, N. Y.—$39,000 will be expended on a sewer system.

Dedham, Mass.—The sewer in High street may be rebuilt.

Emmetsburg, Ia.—A sewer system to cost $35,000 will be built.

Fair Haven, Mass.—3,800 feet of sewer will be built at a cost of $23,150.

Fresno, Cal.—A sewer in Kern street will be built.

Ft. Assinniboine, Mont.—Sewers will be built here.

Girard, O.—Plans have been accepted for the sewer system.

Grand Rapids, Mich.—City wants approximate estimate on the cost of constructing gutters, manholes, catch-basins, storm water sewers and approaches on Carrol avenue and nine others.

Hartford, Conn.—$10,000 may be given the sewer commission as recommended by the Mayor.

Healdsburg, Cal.—This place has under discussion the building of a sewer system.

Hoboken, N. J.—The entire sewerage system will be cleaned. The Mayor.

Houston, Tex.—Plans for a sewer system in two wards have been prepared.

Hudson, Mass.—Will build a sewer system at this place to cost $100,000.

Indianapolis, Ind.—Bids were asked for $100,000 Irvington sewer system.

Janesville, Wis.—Plans are ready for the sewer system. City Engineer.

(Continued on page 28.)

THE STEVENS CAST STONE

Produced Without Tamping or Pressure.

This Building Constructed of C. W. Stevens Concrete Blocks at Harvey, Ill.

Nearly all Artificial Stone Patents issued prior to 1897 were based on some chemical solution such as saltpetre, alum and lime water.

It was soon proved that this was injurious, causing a white stain to appear on the surface of the stone, and at the same time injured the stone, and have been condemned by posted engineers and manufacturers of Portland cement and are absolutely prohibited by the rules of the German and other European Cement Manufacturers Associations

Under the Stevens' process the stone is nourished and fed with just sufficient water to obtain perfect crystallization.

If a newly formed stone is immersed in water at once it becomes a dead stone and causes an imperfect crystallization.

We have the foundation patents on the manufacture of Artificial Stone in a porous mould, as the patent records show.

Our Stone can be seen in hundreds of buildings.

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Factories in Washington, D. C.; Cleveland, Ohio; Syracuse, N. Y.; Chicago; Omaha; Havana, Cuba; New Haven, Conn.; Philadelphia, Pa ; and 20 other factories established and under way. **TERRITORIAL RIGHTS FOR SALE.**

FOR FURTHER INFORMATION, ADDRESS

STEVENS CAST STONE CO., 100 Washington Street, CHICAGO, ILL.

No. 1 Madison Avenue, care of American Stone Co., NEW YORK CITY.

Lebanon, Pa.—The citizens of this place are considering a sewer system.

Lestershire, N. Y.—$60,000 will be spent on a sewer system here.

Lewiston, Ill.—The question of a sewer system is being considered.

Linton, Ind.—Bids were asked for sewers to cost $100,000.

Lisbon, N. H.—This place has voted $4,500 for a sewer system.

Logansport, Ind.—A sewer to drain four counties will be built at an expense of $100,000.

Los Angeles, Cal.—Bids were asked for an outfall sewer.

Manitou, Colo.—A sewer system will be installed at this place, the cost of which is placed at $17,000. E. A. Sawyer.

Marysville, Cal.—$67,000 in bonds have been issued for a new sewerage system and pumping plant.

Medina, N. Y.—The construction of more sewers is contemplated.

Milwaukee, Wis.—It is estimated that a 50-ft. sewer in Center street will cost $21,000.

Minneapolis, Minn.—A sewer will be built in 19th Avenue North. Also a sewer on 6th street.

Muskegon, Mich.—An outlet sewer for Spring street has been planned.

New York, N. Y.—Relief sewers to cost $300,000 have been asked by Boro. Pres. Swanstrom.

Niagara Falls, N. Y.—$35,000 will be spent for sewers.

Palmer, Mass.—$5,000 will be spent on sewers.

Pendleton, Ore.—Plans have been prepared for a sewer system to cost $30,000.

Pensacola, Fla.—This place will vote July 2 on an issue of $200,000 in bonds for sewers.

Penn Yan, N. Y.—Twelve miles of sewers have been planned.

Plattsburg, N. Y.—Sewerage is under consideration here.

Prescott, Ariz.—The water and sewer systems will be extended.

Providence, R. I.—The sewer system will be improved at an expense of $100,000.

Red Lodge, Mont.—$18,816 will be spent on a sewer system. David Lay.

Rushville, Ind.—Plans have been made for a $40,000 sewer system. City Engineer Stewart.

Saginaw, Mich.—Sewers in a number of streets are to be constructed.

San Francisco, Cal.—$700,000 has been recommended for various sewers.

Seattle, Wash.—The sum of $108,000 will be spent on sewers.

Sioux Falls, S. D.—A sewer system is contemplated here.

Skaneateles, N. Y.—The estimated cost of a sewer system is placed at $48,000.

Somerville, Mass.—$25,000 will be spent here for sewer purposes.

South Hadley Falls, Mass.—Surveys have been made by Snow & Barbour, of Boston, for sewers at this place.

Sterling, Ill.—The question of a new sewer system has been under discussion.

Summerville, Ga.—The sewer will be extended 2,500 feet at a cost of $1,200.

Sunbury, Pa.—A private company will build sewers.

Sumpter, Ore.—A sewer system is being considered here.

Victoria, B. C.—$66,000 will be spent at this place for sewers.

Washington, D. C.—Bids are wanted June 6th for sections B and C of B. street and New Jersey avenue sewer. Board of Commissioners.

York, Pa.—A new sewerage system to cost $400,000 will be constructed at this place. R. E. Cochran, Board of Public Works.

CONTRACTS AWARDED

Ashtabula, O.—A contract for sewers in three streets has been let J. T. Clark at $2,260.

Augusta, Me.—E. R. Beau and C. M. Trask have been awarded the contract for 4,200 feet of 8 to 20-inch pipe sewers.

Austin, Tex.—A contract has been awarded John Fields, of Fort Worth, for a sewer on Congress avenue at $19,330.

Bridgeport, Conn.—The Pierce Manufacturing Company has been awarded the contract for extending the Thompson street sewer at $12,500.

Cedartown, Ga.—J. R. Chapman & Co. have been awarded the contract for a sewer in Herbert street at $1,176.

DeKalb, Ill.—A contract has been awarded to C. T. Bartlett, of Evanston, for two sewers.

Jersey City, N. J.—Bernard Cannon has received the contract for sewers.

LaCrosse, Wis.—Contracts have been awarded for sewer extensions as follows: Tenth street, Olaf Swennes for 12-inch pipe at 74¾ cents per foot; on Seventh street, to W. J. Scott, for 12½-inch pipe, at 69 cents per foot; on Third street, to R. F. Weston, for 20-inch pipe, at $1.50 per foot.

Lewiston, Idaho.—The contract for the Normal Hill sewer has been let to Naylor & Harlin at $37,230.

(*Continued on page 29.*)

The Municipal Sanitary Problems of Garbage Disposal and Sewage Purification are our Special Study

GARBAGE

By our new treatment of city refuse of all kinds, whether for simple destruction by fire; or for generation of power; or for conversion into salable products, we remove all the nuisance features and greatly reduce the cost of treatment.

SEWAGE

In the purification of sewage we employ the proven methods of *cnaerobic*, followed by *aerobic* treatment. But by our special system we first remove all sludge and secure a compact plant from which no odors nor offensive gases can escape.

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1123 BROADWAY, NEW YORK CITY

ENGINEERS AND CONTRACTORS FOR CITY WORKS

Plans and Specifications **Guaranteed Estimates** **Contracts Executed**

IMPROVED AUTOMATIC

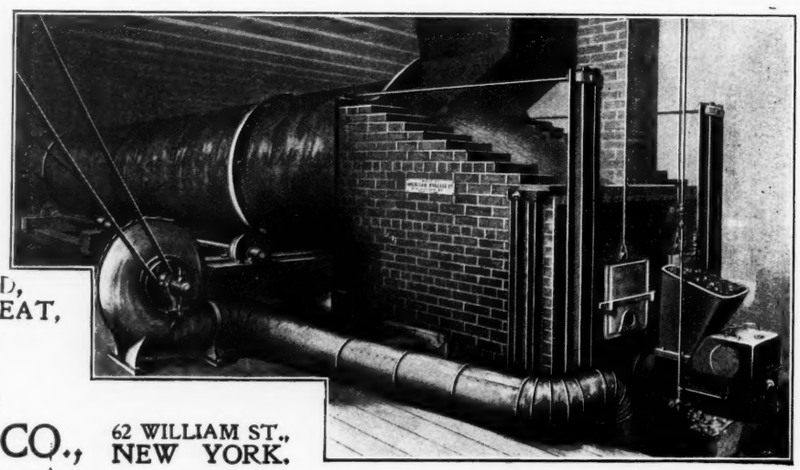
DRIERS

OF ALL TYPES

For the Mechanical Drying of all Materials.
Especially adapted for

GARBAGE, CEMENT, SAND, CLAY, COAL, PEAT,

Packing House Product, Fish Guano,
Coal, Fertilizers, Phosphates, Etc.



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Write for Illustrated Catalogue and mention this paper.

New Haven, Conn.—Contracts for sewers were awarded to J. B. Whittley, Pine street; T. F. Mater, Lombard street, and L. O'Brien, Woodland street.

Newport News, Va.—The contract for a sewer at Fort Monroe has been let W. G. Morris, of Phoebus.

Rochester, N. Y.—Contract let for Hague street pipe sewer to H. B. Hooker & Son at $613. Sawyer street, pipe sewer, B. Bauer, $1,399.

South Bethlehem, Pa.—The lowest bid received for sewers was from G. H. Harden.

St. Louis. Mo.—The contract for Blackstone sewer No. 1 was let to the Municipal Eng. Co. of Chicago. It will cost $159,000. Three contracts for sewer work were awarded to the Rich Const. Company for Blackstone, $126,000; Rock Spring Sewer No. 12, $134,000, and joint sewer No. 1 for $56,000.

San Francisco, Cal.—The contract for the 6th street sewer has been awarded to The City Street Improvement Company.

Seattle, Wash.—The contract for a sewer in Madrone Place has been let F. McClellan & Co.

South Bethlehem, Pa.—The contract for sewers to cost $111,000 has been awarded.

LIGHTING AND TELEPHONE

Almonte, Ont.—The electric plant at this place will be improved, for which $5,000 will be spent.

Allentown, Pa.—The installation of an electric plant is contemplated here. Board of Water Commissioners.

Anita, Ia.—A lighting plant for this place is under consideration.

Atlanta, Ga.—Quite a number of improvements are contemplated by the Standard Telephone Company. C. J. Simmons.

Baker City, Ore.—The plant of the Baker Gas & Electric Company will be enlarged. J. W. Springer, Sanger Gold Mine Co., will put in an electric plant.

Bancroft, Neb.—An electric light plant is talked of. Solomon Keil is an interested party.

Bartow, Fla.—The city has purchased the plant of the Bartow Electric Light Co.

Bartow, Fla.—The expenditure of $10,000 for improving the light plant is talked of.

Belvidere, Ill.—The citizens of this place have voted to have an electric lighting plant. Mayor Pierce.

Berlin, Pa.—An electric light plant has been voted at this place.

Beechmont, Ky.—An electric light plant is being talked of for this place. Village Improvement Society.

Birmingham, Ala.—T. H. Aldrich has been granted a franchise for a gas, power and heat plant, for which plant $300,000 will be spent.

Bowling Green, Ky.—Messrs. Jackson & Omberg, Dyersburg, Tenn., have prepared the plans for the incandescent light plant.

Bowling Green, Ky.—A municipal lighting plant for this place is being considered by a special committee.

Bozemont, Mont.—A new electric light plant will be erected at this place. City Clerk.

Brigham, Utah.—The issue of $10,000 worth of bonds for electric light purposes is being considered.

Burlington, Vt.—A special committee has under consideration the installation of a municipal electric light plant. Alderman Courteney.

Cedarsburg, Wis.—$11,000 of electric light bonds will soon be sold.

Cleburn, Tex.—A fifty-year franchise has been granted the Cleburne Light, Power and Heat Company for a gas plant.

Cleveland, O.—The cost of the municipal electric plant has been placed at $400,000. Mayor Johnson.

Coaticook, Que.—If the city is unable to buy the plant of a private company, it will install an electric plant of its own.

Colton, Cal.—Telephones under city ownership may soon be put in at this place.

Colton, Cal.—George B. Ellis, of Redlands, has applied for a franchise for a gas plant.

Columbia, Tenn.—John H. Carpenter has been granted a franchise for an electric light plant.

Corona, Cal.—A municipal electric light plant is under consideration here.

Crawfordville, Ark.—The Crawfordsville City Telephone & Telegraph Company has been incorporated with a capital of $2,000.

Custer, S. D.—R. K. Fuller and Fred. Beardsbear have secured a franchise for electric light and telephone systems.

Cooperstown, N. D.—C. J. Lucken & Co. have asked for a franchise for a gas plant.

Decatur, Ill.—$20,000 will be spent by the Decatur Gas Company for improving its plant.

Digley, N. S.—The probabilities are that a gas and electric plant will be installed at this place.

Dunkirk, N. Y.—A generator for the purpose of lighting the city will be put in at this place. Water Commissioners.

East Point, Ga.—An electric light plant may be installed at this place. Mayor Thompson.

Edmonton, Ont.—The citizens of this place have voted $25,000 worth of bonds for a municipal light plant.

Elwood, Ind.—The city may put in an electric light plant.

Eureka, Cal.—A power plant on Trinity River to cost $600,000 is under consideration by the Eureka Lighting Company. T. D. Petch, Supt.

Farragut, Ia.—The question of lighting is being discussed.

Floresville, Tex.—$13,000 in bonds have been voted for an electric light plant and water works.

(Continued on page 30.)

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Freeport, L. I.—A telephone system for fire alarm purposes has been voted here. Chief Cronly.

Georgetown, Tex.—New machinery for the electric light and water plants will be installed.

Glasgow, Mont.—An electric light plant is being talked of for this place.

Gransburg, Wis.—An electric light plant has been voted by the citizens of this place.

Grand Rapids, Mich.—A franchise for extending the lighting service was asked by the Thornapple Valley Electric Co.

Granville, Tenn.—A telephone system to Bagdad will be constructed by a company which has recently been organized to Dr. W. A. Hargis.

Greene, N. Y.—Edgar B. Kay, of Cornell University, has prepared plans for the electric light and water works for the village, which are expected to cost $40,000.

Guthrie, Ky.—The town offers a franchise for an electric light plant. Chairman Town Board.

Hubbard, O.—$10,000 worth of bonds for the erection of an electric light plant has been voted here.

Ipswich, Mass.—$25,000 has been voted for a municipal light plant here.

Jamestown, N. Y.—The Mayor desires an enlargement of the electric light plant.

Kenton, Tenn.—$12,500 in bonds will be issued for an electric light plant.

Kennebunk, Me.—The municipal light plant at this place has been burned.

Logan, Utah.—This place is contemplating issuing $65,000 worth of bonds for an electric light plant.

Los Angeles, Cal.—The Edison and United Electric Companies are to be merged and improvements made in the plants. J. B. Miller, President.

Louisville, Ga.—$20,000 worth of electric light and water works bonds will be issued. The Mayor.

Lumberton, N. C.—An electric light plant will be installed, for which $10,000 worth of bonds have been voted.

Manchester, N. H.—The municipal lighting plant bill which was before the Legislature failed to pass.

Mansfield, Mass.—The question of electric lights has been under consideration.

Memphis, Tenn.—Will put in an electric light and ice plant at the hospital to cost $5,000.

Milford, O.—A committee will build electric plant and water works. N. A. Scott.

Milford, Del.—The citizens here have voted $20,000 in bonds for electric lights, paving, etc.

Monroe, La.—$60,000 worth of water and light bonds have been sold.

Monroe, La.—The plant of the Monroe Water Works and Lighting Company has been purchased by the city for $60,000.

Mt. Airy, N. C.—$50,000 in bonds has been voted by the citizens of this place for electric light and water works plants. John W. Hays, Civil Engineer.

Muscatine, Ia.—An electric light plant is under consideration here.

Napoleon, O.—This city will spend $8,000 on utilizing water from the state canal.

Neola, Ia.—It has been voted to install an electric plant here.

New Decatur, Ala.—The gas and electric plants at this place will be improved at a cost of $40,000.

New Orleans, La.—Electric light and power system to cost $1,400,000 is contemplated here. City Engineer Hardee.

Noblesville, Ind.—This place is considering an electric light plant.

Northport, Wash.—A franchise for an electric system has been asked by T. A. Winter and Sam Douglas, of Colville.

Ottine, Tex.—The question of the formation of a company to put in an electric plant is being considered.

Palouse, Wash.—The granting of a franchise to C. E. Frederick and G. W. Peddycord for an electric light plant is being considered.

Pender, Neb.—Electric lighting is being considered.

Pensacola, Fla.—A vote will be taken on the 2nd of July on issuing $50,000 in bonds for an electric lighting plant. City Clerk Jones.

Philadelphia, Pa.—New boilers, etc., will be installed in the power house at the Woman's College.

Phœnixville, Pa.—Bids will soon be asked for an electric light plant. E. L. Luckwalter.

Port Angeles, Wash.—The electric light plant of the city is in need of dynamo, transformers and switchboard.

Portland, Ore.—Bids are wanted June 13th for lighting the public buildings with gas or incandescent lamps for five years. City Auditor Devlin.

Potsdam, N. Y.—A city plant to cost $30,000 is being agitated.

Pottstown, Pa.—Committee will consider question of water works and electric plant.

Randolph, Wis.—An electric plant has been voted here.

Redfield, Ia.—Electric lights and a town hall are improvements contemplated here.

Regina, N. W. T.—John Galt, C. E., Toronto, will prepare plans for the electric light plant and water works.

Rome, Ga.—Municipal ownership of an electric light plant is contemplated.

(Continued on page 31.)

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Sandersonville, Ga.—Reports state that this city will vote on $30,000 in bonds for a municipal electric plant and water works.

Santa Barbara, Cal.—A franchise for an electric light plant has been asked by Reuben Hart.

Schuyler, N. Y.—A franchise to pipe the streets has been asked by the Watkins Illuminating Company.

Seaford, Del.—Bids are wanted in June for an electric plant to cost $10,000. Holton & Spruance, Wilmington, Del.

Sea Isle City, N. J.—The awarding of a gas plant franchise is being considered.

Searcy, Ark.—Bids were soon to be asked for an electric light plant.

Slayton, Minn.—B. I. Weld has been granted a franchise for a gas plant.

Sparks, Ga.—It is reported that the town may be furnished with electricity by R. A. Knight, of Adel, Ga.

Spring Grove, Minn.—Bids are wanted June 2 for $5,500 worth of electric light bonds. Village Recorder Joerg.

Snyder, O. T.—An electric light plant will be installed by W. R. Affeld.

Sodus, N. Y.—The town board of this place has been asked to establish an electric light plant and water works.

Spokane, Wash.—The Spokane Light and Power Company has been granted a 42-year franchise.

St. Louis, Mo.—A power house of 40,000-h. p. is being considered by the St. Louis Transit Co.

Stockton, Cal.—Prof. C. L. Cory, University of California, has prepared plans for a municipal light plant to cost $160,000.

Tillamook, Ore.—A franchise for an electric light system has been let C. E. Hadley, who will erect a $10,000 plant.

Toledo, O.—Bids will soon be asked for electric lights on thirty streets and alleys.

Trenton, N. J.—Plans are being made to place all wires underground.

Vallejo, Cal.—$90,000 will be spent, according to reports, for enlargement of the electric light plant at the Navy Yard.

Vernal, U.—The contract for the $35,000 plant of the Vernal Light & Power Company will be let on July 1st.

Wabash, Ind.—Bids were soon to be asked for electric lighting for five years.

Washington, D. C.—The plans for a power plant for the Great Falls Power Company will be ready in the near future.

Wenatchee, Wash.—The Wenatchee Development Company intends to build a large plant and make other improvements as well, according to report.

Westfield, Mass.—The installation of a municipal power plant at this place is under consideration by a special committee.

Whitewood, S. D.—An electric light plant will be installed here. H. T. Cooper.

Wichita Junction, Okla. Ter.—The Wichita Junction Telephone Company has been incorporated with a capital of $50,000.

Windsor Mills, Ont.—An electric plant will be erected at this place.

Contracts Awarded

Alamagordo, N. M.—A. H. Fisher has received the contract for the electric plant at Fort Stanton Sanitarium at $7,000.

Atlanta, Ga.—The Georgia Railway & Electric Company has received the contract for lighting for five years at $75 per arc and $33.75 for incandescent lights. Chairman Stephens.

Binghamton, N. Y.—Mason I. Ford has received the contract for a heating and lighting plant at $14,417.

Bluffton, Ind.—The contract for a street lighting plant has been secured by the Olds Const. Co., of Fort Wayne, at $24,950.

Christiansburg, Va.—The contract for water works and lighting plant has been let the Unique Power, Light and Water Company, of Cambria.

Cleveland, O.—The contract for the power house of the Cleveland, Painsville & Ashtabula Railway has been secured by Speaker & Co., of Toledo.

Columbus, O.—D. W. McGrath & Company have received the contract for an electric light plant at their bid of $63,675.

Elgin, Ill.—The contracts for the electric light plant equipment have been let as follows: James Scanlan, tubular boiler; Erie City Iron Works, engine; Fort Wayne Electric Works, dynamo and switchboard.

Harrodsburg, Ky.—Contracts for the electric plant have been let as follows: Generators, Commercial Electric Co., Indianapolis; engines and boilers, Ridgeway McEwen Co., Johnstown, Pa.; stokers, Detroit Stoker Co., Detroit, Mich.

Junction City, Kan.—The contract for electric lighting at Fort Riley has been let the Junction City Electric Railway, Light and Ice Co. The plant will be enlarged.

Madisonville, Ky.—The Bailey Light and Water Company have again received the contract for lighting.

Marion, O.—The Marion Electric Light and Power Company have secured the contract for lighting the city.

Middleton, O.—The contract for a coal gas plant has been let the Gas Machinery Company, of Cleveland, O.

Pittsburg, Pa.—The contract for gas and water mains has been let to Ott Bros. at $34,500.

Prince Albert, N. W. T.—The contract for an electric plant has been let the Stuart-Arbuthnot Machinery Company, of Winnipeg.

(Continued on page 32.)

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Reinbeck, Ia.—W. P. Walsh has received the contract for a lighting plant.

San Francisco, Cal.—The contract for a brick power station for the Independent Electric Light and Power Company has been let Robert Mitchell at $36,760.

Shelbyville, Ind.—Contract for lighting has been let the Shelbyville Water & Light Company, and the plants will be improved.

Tacoma, Wash.—The contract for 4,000,000 pounds of steel pipe has been let the Risden Iron Works of San Francisco.

Washington, D. C.—The contract for street lighting has been let the American Lighting Company, of Baltimore, Md., at $25.75 per lamp.

Wheeling, W. Va.—Bader & Hauner have received the contract for building the electric light plant.

WATER SUPPLY.

Alexandria Bay, N. Y.—Bids will be asked in June for village works. H. A. Cornwall, President.

Alturas, Cal.—It is reported that works may be built at this place at a cost of $45,000. J. A. Yates.

Anderson, Ind.—Nothing definite has as yet been done in regard to the mechanical filter, the cost of which is placed at $85,000.

Antioch, Cal.—$30,000 in bonds have been voted here for water works and sewers.

Atlanta, Ga.—$400,000 in bonds have been voted for water works.

Aurora, Neb.—$5,000 in bonds have been voted for extending the water main.

Avon-by-the-Sea, N. J.—$34,000 in bonds have been sold for water works purposes.

Barberton, O.—Water works for this city are under consideration.

Battle Creek, Mich.—A company has been formed which will build water works to cost $150,000.

Belgrade, Mont.—A franchise for water works has been asked by Alex. Freeman.

Belton, Tex.—The city will dispose of the water works.

Benton Harbor, Mich.—The plans for a pumping station have been adopted.

Boise, Idaho.—The Canyon Canal Company will build thirty-one miles of canal, which it is estimated will cost $250,000.

Boulder, Colo.—A new water supply is being considered here. Water Board.

Bloomfield, Ind.—A franchise for water works has been granted to F. H. Dugger & Co.

Bristol, Va.—The water works will be improved, for which purpose the city will issue $150,000 in bonds.

Burk's Falls, Ont.—Plans have been made for water works, to cost $20,000.

Buffalo, N. Y.—This city wants to issue $500,000 in bonds for water works.

Cameron, Mo.—Plans for the water works will be prepared by Hiram Phillips, of St. Louis.

Camden, N. J.—The Neptune City Water Co. has secured a franchise for laying pipe.

Carthage, Mo.—A franchise for water works has been let J. T. Lynn.

Cedar Rapids, Ia.—The city has paid $473,000 for the local water works.

Cedar City, Utah.—This city will install water works.

Center Ossipee, N. H.—This place is considering water works.

Centerville, Ia.—A new well will be sunk here.

Charlotte, N. Y.—The Rochester and Lake Ontario Water Co. will purchase the town water and electric plants.

Chehallis, Wash.—Chehallis Water Company will seek a new source of supply.

Chelan, Wash.—The Chelan Water, Power & Electric Light Company will build a water system.

Chicago, Ill.—Three pumps will be installed in the Chicago avenue station.

Cleveland, O.—Will install a water filtration plant. Engineer Williams.

Columbus, O.—A water filtration plant is greatly needed. The Mayor.

Cordell, Okla. Ter.—$25,000 in bonds have been voted by the citizens of this place for water works.

Corning, N. Y.—The extension of the water works and sewers is being talked of.

Crowley, La.—The pumping plant of the Millerville Irrigation Company has been destroyed by fire.

Dallas, Ore.—Water works will be built at this place, for which $15,000 in bonds will be issued.

Dartmouth, N. S.—A new source of water will be sought.

Defiance, O.—A company has asked for a franchise for works and an electric plant.

Del Rio, Tex.—Surveys are being made for an irrigation canal. G. B. Moore.

Delmont, S. D.—Water works will be built here at a cost of $10,000.

Des Moines, Ia.—About six miles of mains will be laid by the Des Moines Water Works Company.

Dundalk, Ont.—A vote will soon be taken on an issue of $6,000 in bonds for water works.

Elgin, Tex.—$10,000 in bonds have been voted for water works.

Elizabeth City, N. C.—A vote will be taken on a franchise to Baltimore Water & Sewerage Company. A filter may be put in.

Exira, Ia.—Plans are being made for stand pipe, mains, etc., by G. Hunter, Atlantic.

Fennimore, Wis.—The citizens of this place have voted a bond issue for water works.

Fort Collins, Colo.—Water works will be installed at this place at a cost of $200,000, for which a bond issue has been voted.

(Continued on page 33.)

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Ft. Williams, Ont.—The estimated cost of works has been placed at $133,000 and $90,000, according to the system that may be adopted.

Gardner, Mass.—The price to pay for the works of the water company has been discussed.

Gary, S. D.—Water works are being considered.

Gloucester, Mass.—The proposed route of mains is being inspected. Water Committee.

Grand Rapids, Mich.—The Board of Public Works desires to spend $80,000 at once.

Great Barrington, Mass.—$5,000 has been appropriated for water mains.

Greenfield, Mass.—Considering water mains to be laid on Munson street.

Goodline, Minn.—$8,400 of water bonds will be sold. Village Recorder Featherstone.

Gulfport, Miss.—W. F. Wilcox, Jackson, has been preparing plans for water works which are to cost $40,000.

Hartford, Conn.—A filtration plant will be built at this place.

Harrisburg, Pa.—Will build a filtration plant on Bridge Island.

Hawkinsville, Ga.—$40,000 in bonds have been voted for water works and sewers.

High Bridge, N. J.—The formation of a new water company is under consideration.

Holton, Kan.—City Engineer McCabe, of Topeka, will plan water works for this place.

Holyoke, Mass.—A high-service reservoir may be completed at a cost of $50,000.

Huntington, L. I.—Will investigate a water supply for fire hydrants.

Iowa City, Ia.—$20,000 will be spent on pump, etc. Iowa City Water Co.

Islip, N. Y.—The water system will be extended, $69,000 in bonds having been voted for this purpose.

Jellico, Tenn.—A system of water works and sewerage is being considered.

Kingsley, Ia.—May extend 15,000 feet of mains.

Kingston, N. C.—This city has voted $150,000 in bonds for improving the water works and sewers.

Lake Forest, Ill.—This city may buy the local works.

Lancaster, Pa.—Plans for improvements to the water supply to the amount of $145,000 have been considered by a special commissioner. Mayor Cummins.

Latonia, Ky.—A franchise for water works may be let.

Lexington, Mo.—G. Hearle has purchased the Lexington Water Works and will make improvements to the same.

Lone Tree, Ia.—Water works are being considered for this place.

Los Angeles, Cal.—A franchise for a pipe line has been secured by E. V. Baker.

Los Angeles, Cal.—The South Los Angeles Water Company has been incorporated with a capital of $250,000. E. V. Baker.

Lynchburg, Va.—Reports state that water works may be erected.

Mainville, Pa.—This place may build works.

Madison, Ga.—This city will construct a water works system. S. F. Beckham.

Marysville, Kan.—A 20-year franchise for water works system has been asked by H. J. Allen, Denver, Colo.

Medina, N. Y.—The purchase of the water plant is recommended by a special committee.

Mesa, Wash.—J. W. Harris has secured a franchise for water works.

Milford, O.—Bids were to be asked for works to cost $26,500. Mayor Buckingham.

Minneapolis, Minn.—Will lay water mains on Clinton avenue. J. C. Haynes, Mayor.

Monroe, La.—The plant of the Monroe Water & Light Company has been sought at $60,000.

Monroe, N. J.—Monroe Water Company has been granted a franchise for water mains.

Mt. Clemens, Mich.—Engines and boilers for the water works have been voted.

Mt. Pleasant, Utah.—Bonds for water works have been voted by the citizens.

Muscoda, Wis.—Consideration is being given to the question of works.

Napoleon, O.—It is possible that new engines will be needed at the water works. Supt. N. F. Clark.

Natchez, Miss.—$150,000 in bonds will be issued for municipal water works.

Newburyport, Mass.—The water commissioners are considering the use of river water and artesian well supply.

New Britain, Conn.—A 14-inch main was to be laid in Myrtle street at a cost of $20,000.

Nez Perce, Idaho.—Works will be built here, for which $6,700 have been voted.

Niagara Falls, Ont.—A pump to cost $12,000 is being considered.

New Sharon, Ia.—Will lay 8,000 feet of mains.

Niagara Falls, N. Y.—Bids will be asked in June for a $12,000 pump for water works.

Onawa, Ia.—This place is considering water works.

Ottawa, Ont.—Will plan auxiliary steam plant.

Palmer, Mass.—The cost of the pipe line in three towns has been placed at $10,000.

Parnell, Ia.—Water works will be installed at this place.

(Continued on page 34.)

STEEL CARTS AND WAGONS
FOR GARBAGE, NIGHT SOIL ETC.
TIGHT & ODORLESS EXPLANATORY BOOKLET ON REQUEST
UNITED STATES SANITARY COMPANY WASHINGTON D. C.

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PILE DRIVERS

Root Spiral Riveted Pipe,
3 IN. TO 30 IN. DIAMETER.
For all Liquids and Exhaust Steam.
Flanged or Slip Joints, Galvanized or Asphalted.
Fittings and Connections to suit service required.
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No Soda No Potash No Cement No Secret Process
For testimonials and particulars, address
The Schwarz-System Brick Company
6, 8, 10 Bridge Street, Maritime Building, NEW YORK, N. Y.

Park City, Mont.—Water works are contemplated for this place.

Pensacola, Fla.—A vote will be taken July 2 on an issue of $250,000 bonds for water works.

Penn Yan, N. Y.—Keuka College will have complete works.

Phœnix, Ariz.—The Phœnix Water Company will spend $150,000 on improvements.

Phoenix, Ariz.—The government will build a reservoir in Tonto Basin at a cost of $2,500,000.

Port Jefferson, N. Y.—The Port Jefferson Water Company was to lay half a mile of water main.

Proctor, Vt.—A vote has been taken and the water works will be improved.

Providence, R. I.—This place has been estimating the cost of a pumping engine for Pettaconsent Station.

Quincy, Ill.—New works are being considered here.

Rahway, N. J.—This place will probably build a filter plant at a cost of $30,000.

Reading, Pa.—A 15,000,000 gallon pump, to cost $80,000, as well as other improvements, have been recommended. Supt. Nuebling.

Red Lake Falls, Minn.—City desires to grant a 30-year franchise to a company puting in water works.

Redlands, Cal.—The Board of Trade wants a large water supply for irrigation.

Reno, Neb.—About two miles of pipe is to be laid from Clear Creek to Carson Indian School.

Richmond, Mo.—A filter plant may be installed here. Mayor Shoon.

Sacramento, Cal.—A filter plant will be planned by the city surveyor.

Salem, S. D.—Reports state that a compressed air system of water works may be installed.

San Diego, Cal.—$190,000 in bonds have been voted for water works.

San Francisco, Cal.—The Spring Valley Water Company has been incorporated with a capital of $28,000,000.

Santa Barbara, Cal.—The water works at this place will be extended at a cost of $200,000.

San Jacinto, Cal.—The installation of a water supply at a cost of $100,000 has been under consideration.

St. Catherine's, Ont.—May extend the water mains at a cost of $40,000.

Seattle, Wash.—An extension of the water supply to Ballard is contemplated.

Seattle, Wash.—$49,000 will be spent on laying the Rainer avenue water main system.

Sheboygan, Wis.—A new system of water works is contemplated. The Mayor.

Shelburne Falls, Mass.—A water supply for fire protection purposes is being considered.

Silverton, Colo.—One and one-half miles of 10-inch galvanized iron pipe were wanted.

Sioux City, Ia.—The water plant here will be extended at a cost of $250,000.

South Bethlehem, Pa.—The Consolidated Water Company will purify the water.

South Bend, Ind.—A Corliss engine will be purchased for the water works.

South Braintree, Mass.—$9,000 has been voted to extend the water system.

Spanish Fork, Utah.—$16,750 worth of bonds will be issued for water works.

Springfield, Neb.—A vote will be taken here on the installation of water works.

Springfield, S. D.—$3,000 in bonds have been voted for water works.

Spencer, S. D.—The installation of works is being considered.

Spencer, S. D.—A vote will be taken on the building of $5,000 water works.

Springfield, Tenn.—The citizens will vote on a bond issue of $35,000 for water and light plant.

Standish, Mich.—$20,000 bonds for water works, electric lights, etc., have been issued.

St. Cloud, Min.—The St. Cloud Water Works Company wishes to sell its works to the city. Improvements to the amount of $50,000 are contemplated.

Stevens Point, Wis.—City is thinking of buying the plant of the local company.

Storm Lake, Ia.—Filtration of the water supply is under consideration.

Woodhaven, N. Y.—The Woodhaven Water Supply Company will extend its mains. 19 Cliff street, N. Y.

Contracts Awarded

Agricultural College, Mich.—The contract for water works has been let Brooks & Son, Jackson.

Allentown, Pa.—The Holly Pump Company has received the contract for a 10,000,000 gallon pump at $34,500.

Bennington, N. H.—The Osgood Concrete Company has been awarded the contract for laying pipe.

Cleveland, O.—The Cleveland Steam Boiler Company has received the contract for pipe at $8,300.

Columbus, O.—The contract for 13,000 feet galv. iron pipe has been let the Columbus Supply Company.

Dexter, Me.—The Camden Iron Works, of Camden, N. J., has received the contract for pipe for water works.

Downs, Wash.—The Washington Pipe Company has been awarded the contract for 6,300 feet of pipe.

Dyersburg, Tenn.—The Chicago Bridge & Iron Company has been awarded the contract for a stand pipe 27 x 50 feet, at $3,788.

Elgin, Ill.—Contract for tunnel, etc., at artesian wells has been let Bracey, Howard & Co. at $25,950.

(Continued on page 35.)

WHITNEY'S REAR END DUMPING WAGON

Manufactured by

Whitney Dumping Wagon Co.

Hornellsville, N. Y.

LATEST AND BEST

PATENTED APRIL 14TH, 1903.

Frame and bodies made of steel.
No castings used.
No wood to split, shrink or swell.
Spreads material for road building.
Distance from king-bolt to load 9 inches, insuring lightest draft.
Turns in its own length.
Will not leak or dump itself on road.
Bodies and seat may be removed and wagon used for other purposes.
Can unload either or both bodies at a time.
Can carry two kinds of material if desired.
Driver operates entirely from seat without stopping team.
Air-tight steel case for asphalt.
Saves from one-third to one-half day labor.
Requires but five seconds to unload and close bodies ready to reload.

WRITE FOR PRICES AND DETAILS.

Elgin, Ill.—The contract for pumps and engine has been awarded the Jackson Machine Company, of San Francisco, Cal.

Enfield, Mass.—The contract for five miles of pipes has been awarded to Eglee Bunting Company, Boston, at $6,500.

Falmouth, Mass.—The contract for water pipe has been let Bruno & Milano.

Goldendale, Wash.—The contract for building a reservoir has been let Thomas Deering.

Joliet, Ill.—The contract for a water tower has been let the Chicago Bridge & Iron Company at $15,000.

Kansas City, Mo.—The contract for a pumping engine at Turkey Creek has been awarded the Allis-Chalmers Co. for $106,000, and one at Quindoro to Barr Co. at $85,000.

Levis, Que.—The contract for water works has been awarded Dussault & Powell.

Littleton, N. H.—The contract for ten miles of pipe has been let Charles Miller's Sons Co., of Utica, N. Y.

Millville, N. J.—A contract has been made with the People's Water Co. for $6,000 a year.

Quincy, Mass.—A contract for 170 tons of cast-iron pipe 4-10 inc. has been let W. D. Briggs, of New York, at $5,000.

Richfield, Utah.—The contract for water pipe has been awarded the Crane Co., of Chicago, at $18,000.

Schenectady, N. Y.—Messrs. Miller & Co., of Utica, have been awarded the contract for water mains at $20,000.

Shelbyville, Ind.—The contract for water and light has been awarded the Shelbyville Water & Light Company at $10,170.

Tacoma, Wash.—The contract for a main on St. Paul avenue has been let the Washington Pipe & Foundry Co. at $1,180.

Victoria, B. C.—W. Bowmass has been awarded the contract for 350 metres at $3,745.

West Seneca, N. Y.—The contract for 77 hydrants has been let to the Depew Water Company, the price being $50 per annum.

Wellsville, O.—The Deane Steam Pump Company of Holyoke, Mass., has been awarded the contract for pumps.

Wheeling, W. Va.—The contract for a reservoir has been let George Bauer, of Pomeroy, O., for $15,000.

FIRE APPARATUS.

Sumter, S. C.—Desires to purchase a hook and ladder truck with chemical engine combined. Address, Mayor A. B. Stuckey.

Atlantic City, N. J.—Wants a paid fire department. Chief Engineer Huey.

Baker City, Ore.—More fire apparatus for this place is under consideration.

Bakersfield, Cal.—A fire department has been organized here.

Beaumont, Tex.—This place will organize a fire brigade.

Berlin, N. H.—A chemical engine is recommended by the Mayor.

Corydon, Ia.—An issue of $5,000 worth of bonds will be made for the purpose of equipping a fire department.

Dauphin, Pa.—A hose company may be organized at this place.

Douglaston, L. I.—This place has under consideration the installation of a hose company.

Fort Edward, N. Y.—One thousand feet of hose will be bought. Chief.

Galion, O.—This place will offer for sale $4,000 worth of fire bonds.

Greenfield, Mass.—This place may purchase three new fire alarm boxes, extension ladder sixty-five feet long and a chemical tank. The city has allowed $6,862 to the fire department.

Hamtrauck, Mich.—This village will have a fire department. Pres. Russell.

Jersey City, N. J.—New fire houses will be built, for which $35,000 in bonds will be issued.

Kansas City, Mo.—May issue bonds for three new fire stations, apparatus and equipment.

Lake Linden, Mich.—A fire department is under consideration at this place.

Larchmont, N. Y.—The installation of a fire alarm system is contemplated.

Little Valley, N. Y.—Funds will be raised for the purchase of an equipment.

Lowellville, O.—A fire department has been founded. Chief Lotz.

Marion Heights, Pa.—A fire company will be organized.

Moncton, N. B.—This city will spend $4,500 on fire appliances.

Norwich, N. Y.—$30,000 will be spent on the department at this place.

Palmer, Mass.—Wants better fire protection.

Portland, O.—A new fire boat is contemplated.

Poughkeepsie, N. Y.—Apparatus for the department will be purchased. Chief.

Punxsutawney, Pa.—An aerial truck has been asked for the fire department.

Revere, Mass.—A steamer to cost $6,000 is being considered.

Roland, N. Y.—A volunteer company has been formed.

Sibley, Ill.—This place may buy an engine.

Slatington, Pa.—The fire and police committee recommended Eureka hose for the department.

Walsenburg, Colo.—A chemical engine may soon be purchased. Chief Setter.

(Concluded on page 36.)

HOOKE'S

Combined Fire-Wagon and Asphaltic Mixture Heater.

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BY the use of this Heater cities may repair their own Asphalt Pavements, re-heating and using old material.
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OUR wagons are as simple in construction as an ordinary farm wagon. Load is properly distributed over both axles. Angle of elevation is entirely under control. No rollers, racks, tracks or levers used. Numbers of our Wagons in use carrying 4½ tons of asphalt easily drawn by two horses. They save their cost in a short time in comparison with other dumping wagons. We make Dumping Wagons for every service required. Write for printed matter and full particulars.

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ESTABLISHED 1853.

68 Flushing Avenue, BROOKLYN, NEW YORK.

Watervliet, N. Y.—Better fire protection for Mannville is needed.

Watertown, N. Y.—Two fire steamers and a water tower, to cost $65,000, are being considered.

CONTRACTS AWARDED

Baltimore, Md.—The contract has been let for two fire engines at $11,000 and truck at $4,800, and four combination hose wagons for $7,200, to Holloway & Co.

St. Paul, Minn.—The contract has been let for a new fire engine to W. S. Nott, for $5,300 and allow $1,500 for old Silsby engine.

Trenton, N. J.—The contract has been let for 4,500 feet of hose to Empire Rubber Co. and Globe and United Company.

Washington, D. C.—A contract has been awarded Charles T. Holloway Company, of Baltimore, for hook and ladder truck and three chemical hose wagons.

MISCELLANEOUS

Albany, N. Y.—Bids were wanted for ash and rubbish removal from the schools.

Amityville, N. Y.—A sewage disposal plant will be installed at the Brunswick Home Company.

Atlanta, Ga.—Sewage purification plants will be installed here.

Balston Spa, N. Y.—A sewage disposal plant to cost $80,000 is under consideration.

Buffalo, N. Y.—A new garbage and refuse disposal plant has been planned.

Buffalo, N. Y.—A septic tank will be built at this city.

Charleston, W. Va.—Bids were wanted for 15,000 cubic yards of dredging.

Chicago, Ill.—Plans for a garbage crematory are being made.

Chicago, Ill.—An issue of $3,000,000 for park purposes is probable.

Cincinnati, O.—The question of street sprinkling by the city was voted on.

Elwood, Ind.—It is reported that a garbage plant will be erected at a cost of $35,000. Mayor Smith.

Findlay Lake, N. Y.—$4,000 will be spent for dredging in the lake.

Girard, O.—The plans which were submitted for a sewage disposal plant have been accepted.

Guthrie, O. T.—T. A. White, C. E., has asked for information in regard to sewage disposal plants for institutions.

Jacksonville, Fla.—The citizens of this place are considering the erection of a $100,000 garbage crematory.

Jackson, Mich.—Plans for sewers, sewage pumping station and disposal works have been prepared by George S. Pierson, of Kalamazoo, for the Board of Public Works.

Kansas City, Mo.—The city will ask for a bond issue to the amount of $500,000 for improving the parks.

Lake Cora Resort, Mich.—A sewage disposal plant is being erected here by George S. Pierson, of Kalamazoo.

Leominster, Mass.—A sewage disposal plant will be erected at this place.

Madison, Wis.—The citizens have voeed for a garbage and sewage disposal plant.

Marengo, Ill.—Plans for a sewage purification plant have been made by W. S. Shields.

Moultree, Ga.—This place will have a park. City Council.

New Bedford, Mass.—An extension of Buttonwood Park is being considered.

New York, N. Y.—$25,000 in bonds will be issued for a garbage crematory for Richmond borough, also $45,000 for carts, etc. Dept. of Street Cleaning.

Oakland, Cal.—Plans for a salt water sprinkling plant have been made.

Oakland, Cal.—Plans for the improvement of West Oakland Park have been made by F. C. Turner. These improvements are estimated to cost $40,000.

Penn Yan, N. Y.—Plans have been made for a sewage disposal plant here.

Pleasantville, N. Y.—A sewage disposal plant has been under consideration.

Pueblo, Colo.—The plans contemplated by the park commissioners will necessitate the expenditure of $175,000.

Racine, Wis.—This city will spend $15,000 for a public park.

Rockville, Conn.—This place has been considering a sewage filtration bed.

San Francisco, Cal.—This city will lay out two parks and two playgrounds.

Scranton, Pa.—$100,000 will be issued in bonds for the improvement of Nay Aug Park.

Seattle, Wash.—P. G. Yaw has asked for a thirty-year franchise to collect and burn the garbage.

St. Joseph, Mo.—This place is considering the question of garbage disposal.

Syracuse, N. Y.—Plans are being made for the expenditure of $18,000 for deepening Harbor Brook.

Washington, Mo.—The Washington Sanitary Street Cleaning & Flushing Company has been incorporated with a capital of $5,000.

York, Pa.—This place will have another park.

CONTRACTS AWARDED

Albany, N. Y.—The contract for the removal of ashes and rubbish from the public schools has been let to W. D. Gregory for 12½ cents a yard.

Corinth, N. Y.—A. H. Banker has been awarded the contract for a sewer system and disposal plant at $25,000.

Red Lake Falls, Minn.—The contract for the Lambert ditch No. 1 has been let to E. A. Moran, 42,669 cubic yards. James E. Ford, County Auditor.

South Bend, Ind.—The contract for the garbage crematory has been let the Dixon Garbage Crematory Company, of Toledo, O.

Tacoma, Wash.—The contract for two dredgers has been awarded to J. B. Lockwood and J. A. Sloan.

Warsaw, Ind.—The contract for the Turkey Creek ditch, twenty miles long, has been let to M. A. Jones, John Hughes and Ananias Ipe at $43,827.

Washington, D. C.—R. W. Rush has been let the contract for street cleaning.

Austin Street Sprinklers

are preferred in every state and nearly every city in the country. Built in six styles and seven sizes. Steel frames, wood or steel tanks. High-grade Wheels. Trussed gears. Simplest and most effective sprinkling valves. From a drench to a spray, with side cut-off and controlled by only two levers.

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SANITARY STREET SWEEPING COMPANY

Virginia Ave. and 5th St., S. E. **Washington, D. C.**

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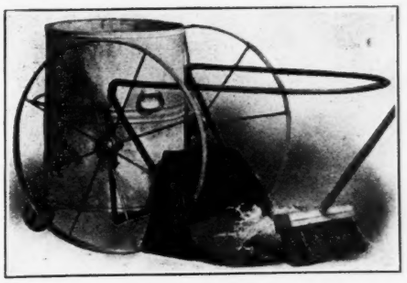

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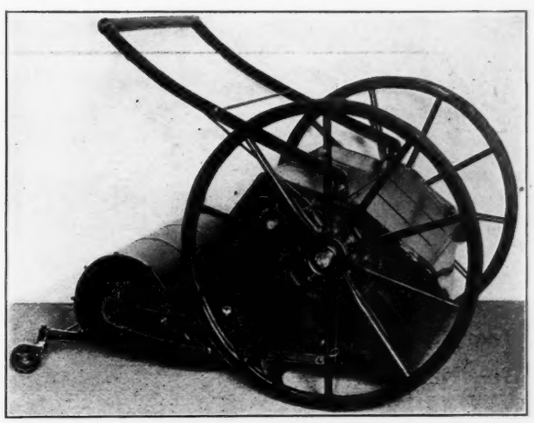

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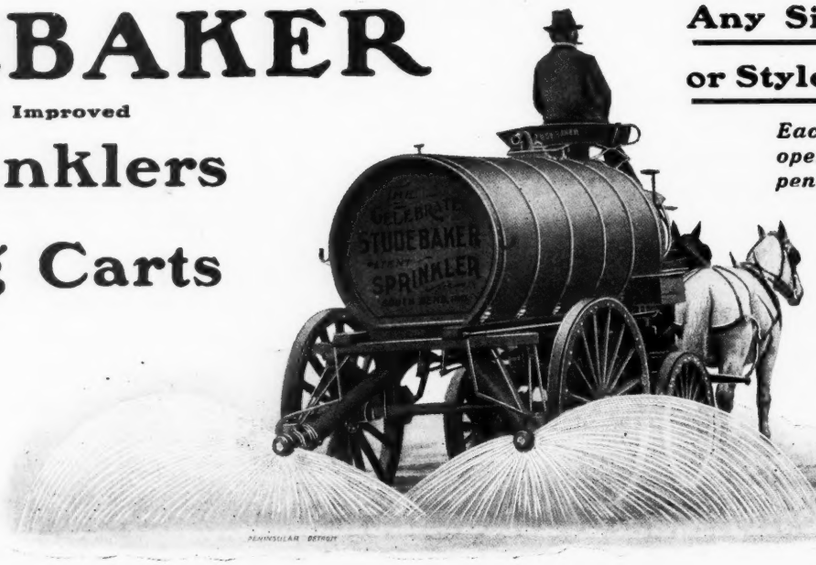

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This wagon dumps from the bottom by means of levers, without the driver leaving his seat. The bottom is closed without stopping the team. Wood hub wheels. Drop or stiff tongue. Painting: gear red, body green. Complete with wings, neck yoke or chains and whiffletrees. Capacity, two cubic yards.

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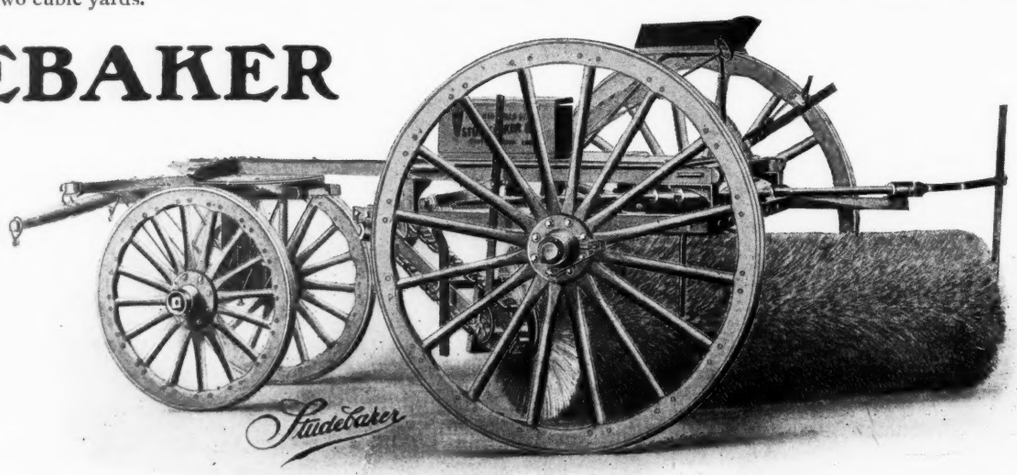

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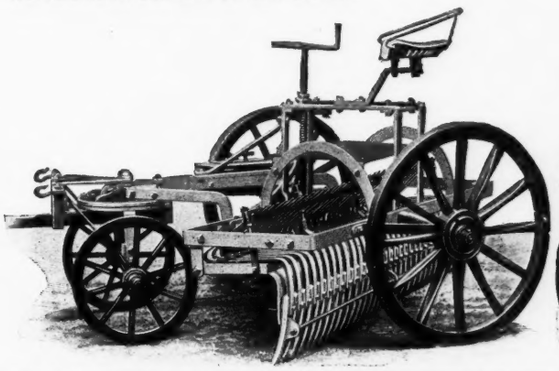

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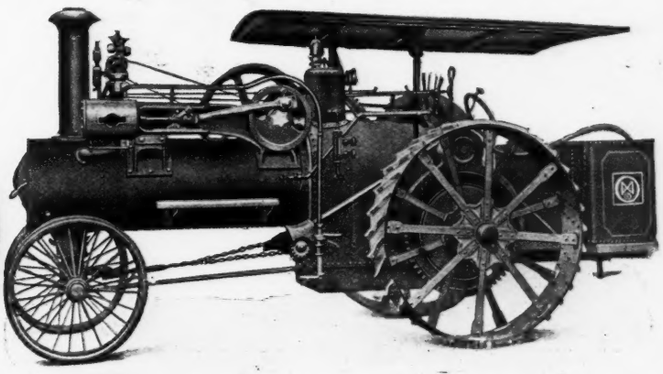

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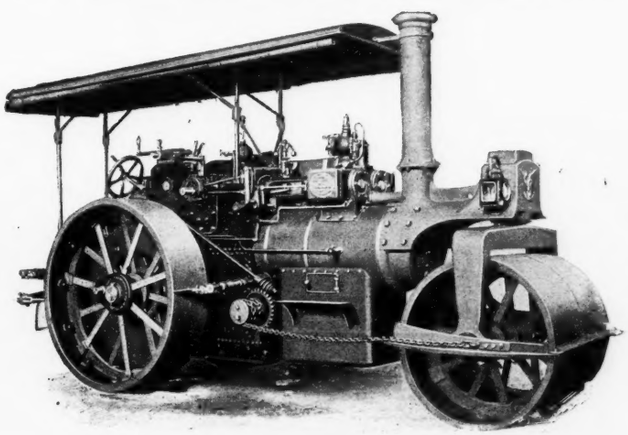

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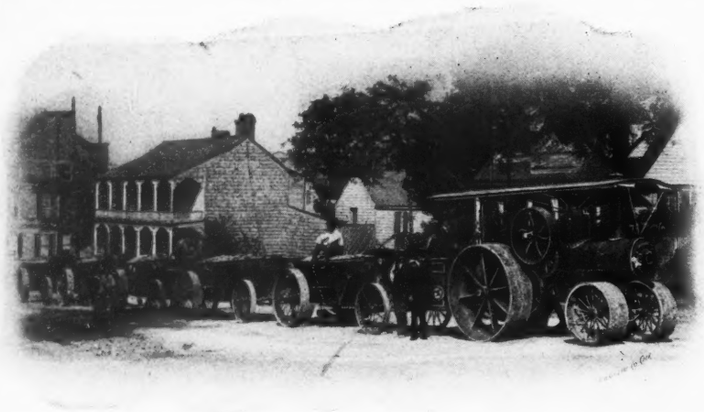

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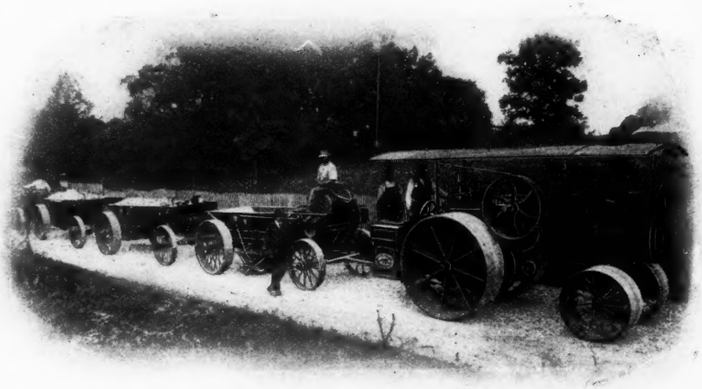

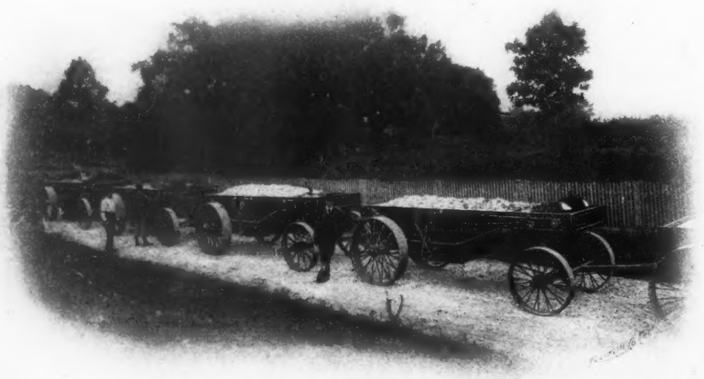

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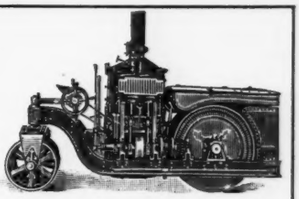

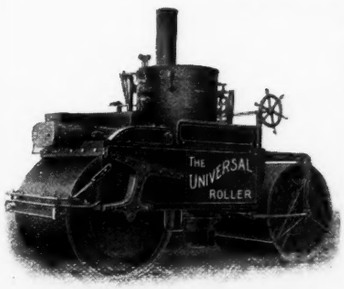

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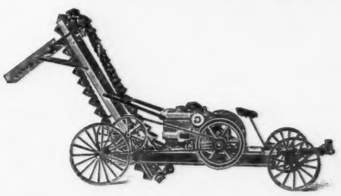

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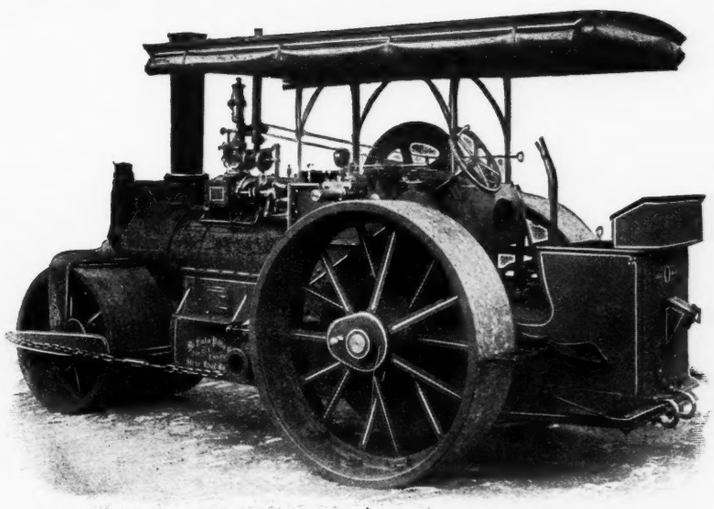

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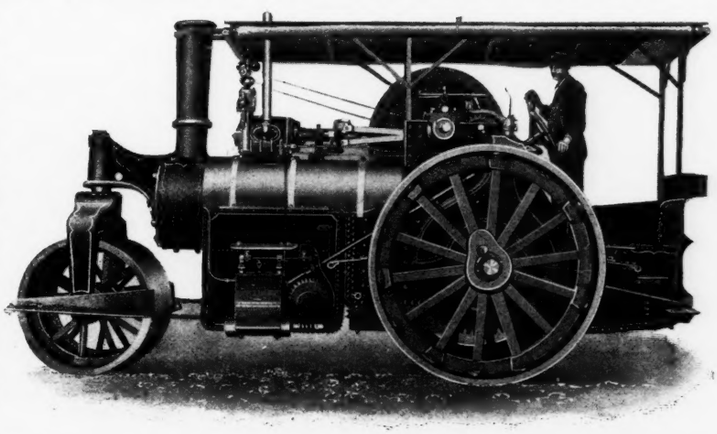

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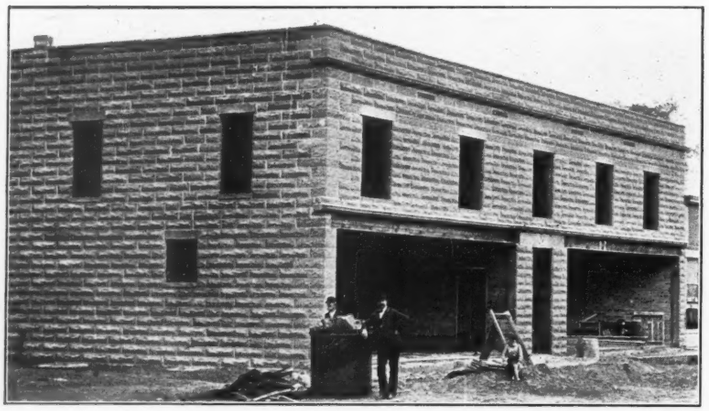

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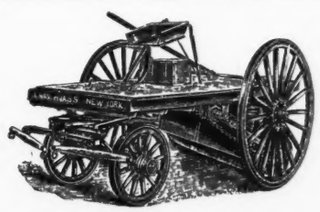

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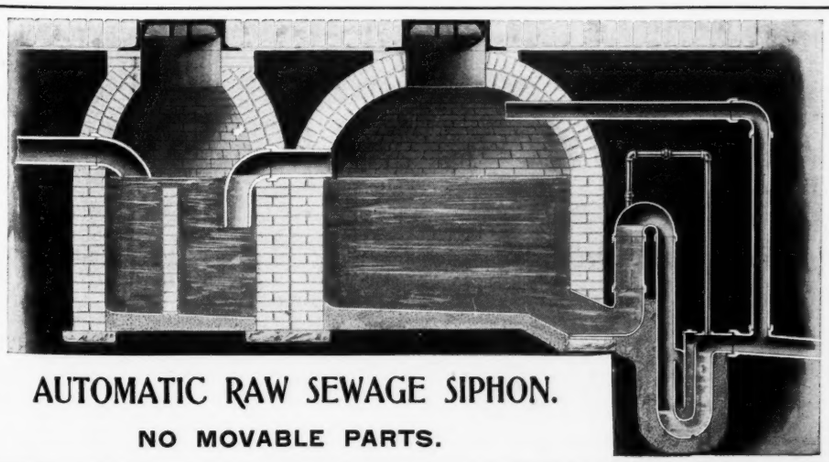

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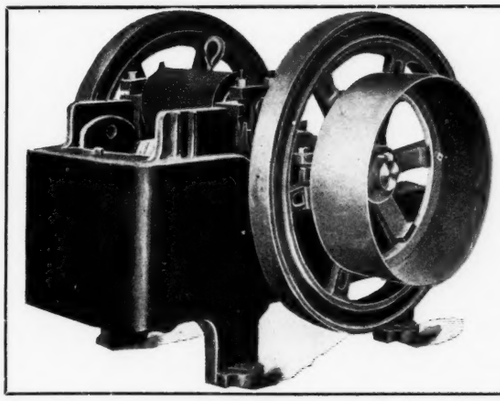

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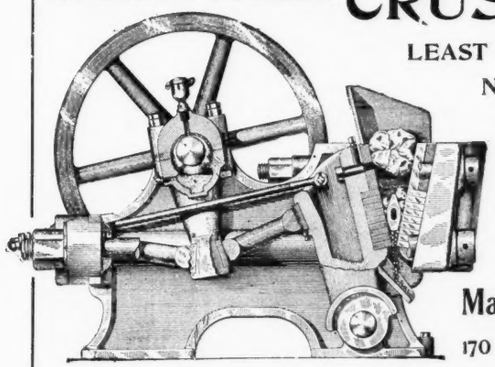

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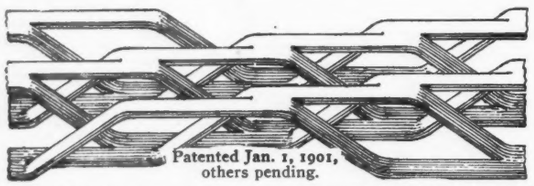

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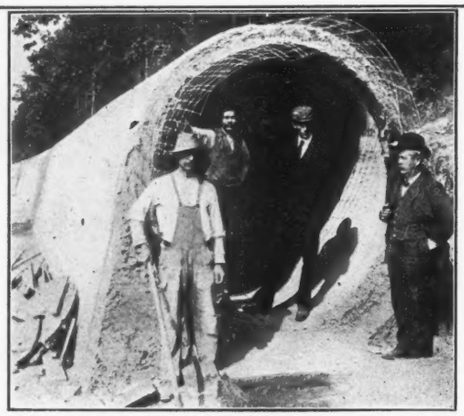

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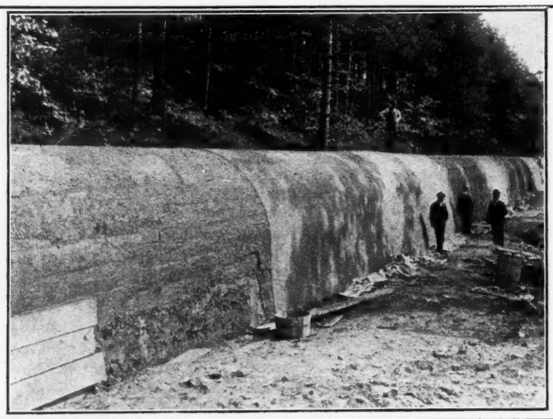

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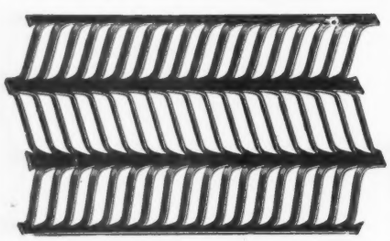

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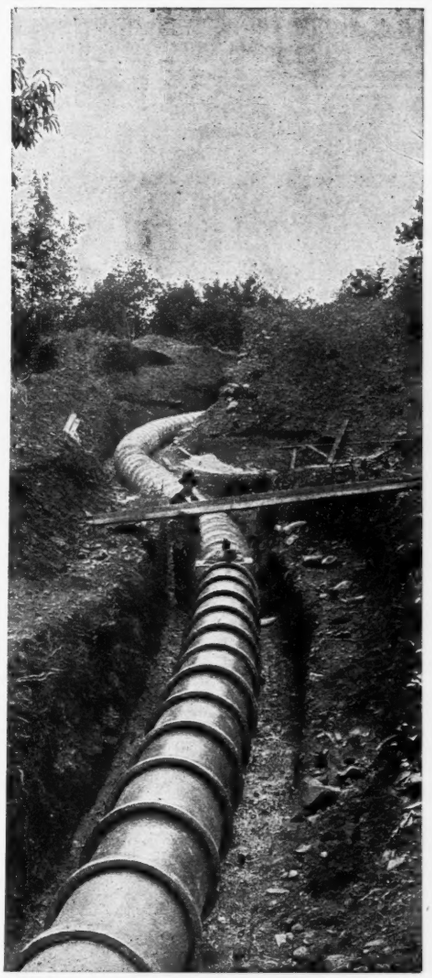

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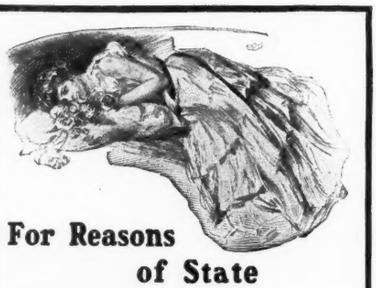

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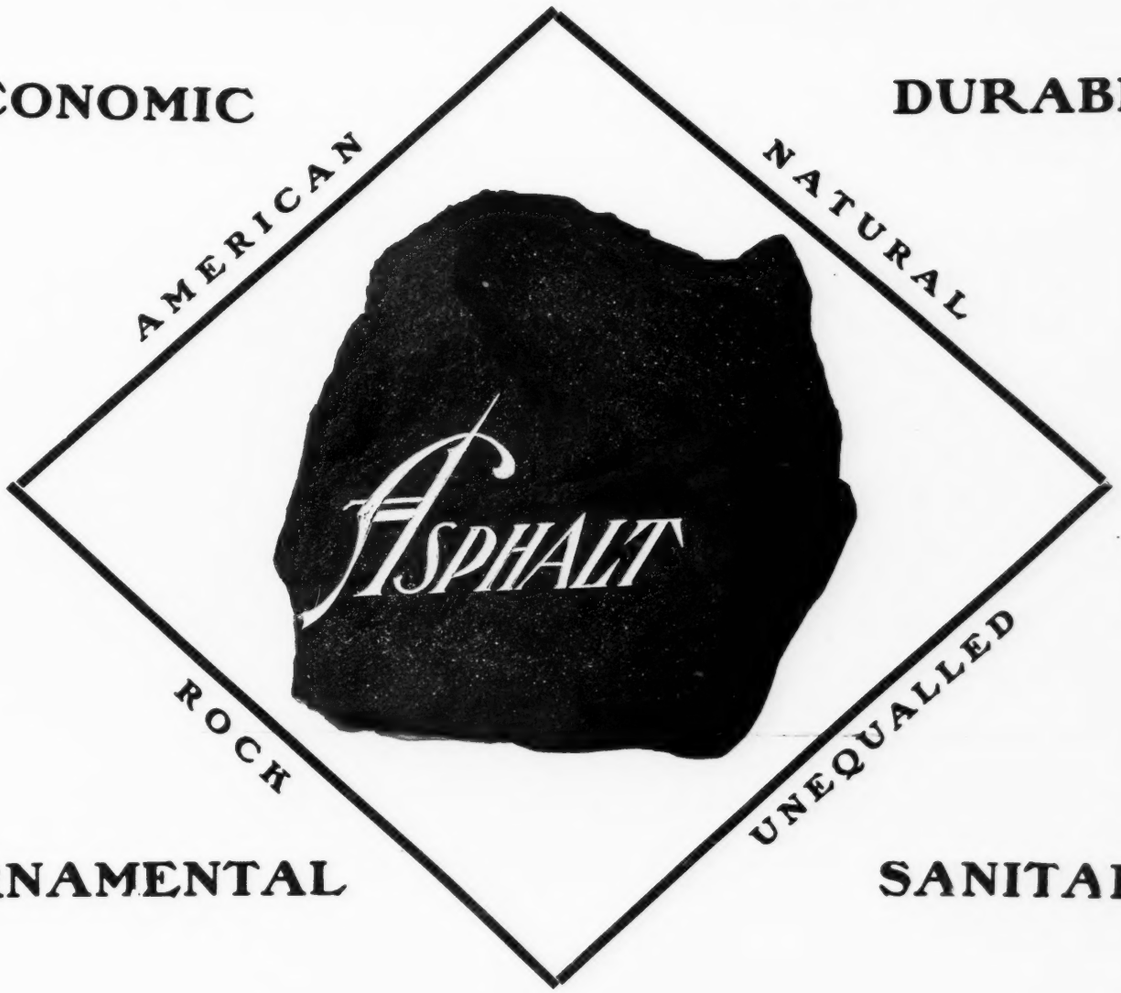

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Material Prepared at the Company's Mines in Kentucky. Delivered Ready for Warming and Laying. No Plant Required. Longest Life. Easiest Traction. Surest Footing. Reasonable Cost. No Maintenance Expense.

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Warren's Acme High Grade 99% Pure Asphalt.....

Contains no soluble salts or dirt. Does not require admixture of still wax or parafine oil, or bitumen of another class, to give it the proper consistency. Does not rot. Is a fine natural asphalt. Furnished in any degree of hardness as desired for any purpose.

Will Give Territorial Rights on Reasonable Terms. Laboratory Work, Expert Advice and Asphalt Paving Plants Furnished.

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Capacity — 40,000 tons per year.

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GLOBE ASPHALT CO.,

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200,000 Square Yards Pavement laid in 1900.

99.6 per cent. Bitumen

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ROAD BUILDING MACHINERY

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Acme Road Mach'y Co., Frankfort, N. Y., U. S. A.

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The richest in Bitumen and most durable in the market

Apply to OTTO E. C. GUELICH,

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ALL GRADES. ALL PRICES

Genuine Bermudez Lake Asphalt. Genuine Trinidad Lake Asphalt

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For Paving, Roofing, Water Proofing, Paints, Varnishes, Insulation, Etc., Etc.

ASPHALT For every purpose used

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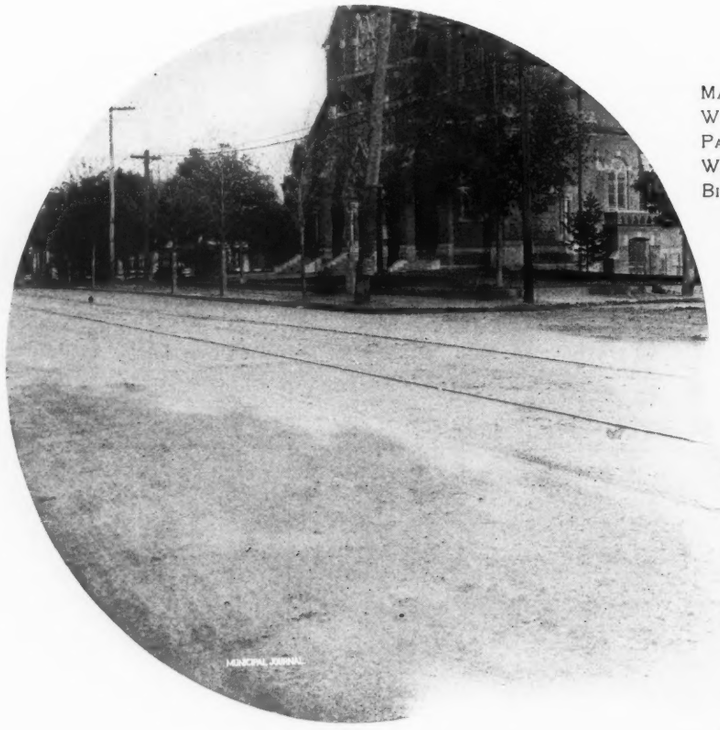

MAIN ST.
WORCESTER, MASS.
PAVED WITH
WARREN'S PATENTED
BITULITHIC PAVEMENT.

Why Warren's Bitulithic Pavement is Superior to Macadam.

STONE is used as in macadam to provide structural strength, but the sizes are assorted so that the finer will fill the voids of the coarser, consequently more stone is used.

Furthermore, every space is filled with Warren's Puritan Brand of Bituminous Cement, which is waterproof.

The stone cannot be dislodged as in macadam. The surface cannot wash away or grind from friction and may be swept and cleaned.

The finest stone used in the Bitulithic Pavement to fill voids is mixed with bitumen and is a waterproof mortar. Dry weather and traffic does not convert it to dust, nor wet weather to mud.

The Bitulithic Pavement is always in good condition, dry or wet.

Our Pavement Patents are valid because stone has never been used before in predetermined proportion and mixed with bitumen.

Our Apparatus Patents are valid because no device has ever been arranged before for screening stone after it is dried. We separate the stone into seven sizes and use by exact weight.

WARREN BROTHERS COMPANY

POSTAL TELEGRAPH BLDG., NEW YORK. 93 FEDERAL ST., BOSTON.

WARREN'S BITULITHIC PAVEMENT, MAIN STREET, WALTHAM, MASS.

Why Warren's Bitulithic Pavement is Superior to Asphalt.

HARD stone instead of sand takes the wear. The stone permits the use of a softer tempered bitumen—one with more life—it fills all voids and is not subject to attack by air and water.

The stone offers a surface just rough enough for horses, yet smooth enough to be noiseless and makes the least slippery pavement ever laid. Is in successful use on 12 per cent. grades. The Bitulithic Pavement will outlast asphalt or macadam. Is sanitary, noiseless, non-slippery, dustless, will not rot nor disintegrate, and superior to either asphalt or macadam pavements under any and all conditions.

Some 50 cities have specified and contracted for this pavement.

Wherever laid City Officials are enthusiastic in its praise and unhesitatingly pronounce it the nearest approach to an ideal pavement ever produced.

WARREN BROTHERS COMPANY

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WARREN'S BITULITHIC WATER-PROOF PAVEMENT

IS

SUPERIOR TO ALL OTHER BITUMINOUS OR ASPHALT PAVEMENTS

We have constructed this pavement on Talbot Street and Peter Street, London, Ontario, and earnestly solicit inspection of the work by officials and taxpayers interested in street pavements.

During the past year this pavement has been laid and contracted for in over

FORTY CITIES

in the United States and Canada to the extent **of over 700,000 square yards.**

"It looks to me like a pavement that will outwear the best asphalt pavement"—C. W. DILL, ROADWAY ENGINEER, City of Toronto.

"The Warren Bros Co. have solved the problem of permanent pavement."—W. J. EVANS, Assistant Street Commissioner, Toronto.

Correspondence solicited from all parts of Canada. Information given and descriptive circulars sent on application.

THE WARREN BITUMINOUS PAVING CO., OF ONTARIO, Ltd.

Branch Office,
Oxford and Talbot Sts.,
London, Ontario.

Head Office,
158 Bay Street,
Toronto, Ontario.

More than 700,000 square yards of Warren's Bitulithic Pavement

Were Contracted for the past year.

IT APPEALS ALIKE TO PROPERTY OWNERS AND ROAD DRIVERS, IS DURABLE, SANITARY, NOISELESS, WATERPROOF, NOT SLIPPERY, DOES NOT CRACK, UNEQUALLED FOR HEAVY GRADES, WILL NOT DISINTEGRATE

"So satisfactory is our piece of Warren Pavement that we shall, at the earliest possible day, re-surface our four miles of ordinary macadam with that material.--JOSEPH H. BELL, Street Commissioner, Salem, N. J."

"It is giving, and I believe will continue to give, better satisfaction than any other pavement we could have laid.--S. CAMERON CORSON, City Engineer, Norristown, Pa."

Agency for Eastern Pennsylvania and New Jersey.

Warren Brothers Company,

Harrison Building, Fifteenth and Market Sts., PHILADELPHIA, PA.

Bitulithic.
(Registered Trade-Mark)

Bituminous Macadam.
(Registered Trade-Mark)

BITULITHIC

(Registered Trade Mark)

The Best Form of Warren's Bituminous Macadam Waterproof Pavement

IT

WILL NOT ROT OR DISINTEGRATE

North Common Street, Lynn, Mass. Paved with Warren's Bitulithic Pavement.

42 cities have specified and contracted for large areas, and with best pavement wherever a smooth, non-slippery, durable, noiseless paving is required.

Warren Brothers Company, Postal Telegraph Building, New York.
93 Federal Street, Boston.

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THE STANDARD FOR RUBBER INSULATION

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Wax and Gum Treated Fire Hose,

CARBOLIZED RUBBER HOSE.

FIRE DEPARTMENT SUPPLIES.

Largest Manufacturers of Fire Hose in the World.

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A PORTLAND CEMENT OF THE HIGHEST CHARACTER

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